

MACHINE GUN MANUAL

APPLICABLE TO

THE COLT THE LEWIS AND OTHER MACHINE GUNS

BY

CAPT. A. H. BIRSEY

Canadian Expeditionary Force

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BY

**CAPT. A. H. BIBBY
CANADIAN EXPEDITIONARY FORCE**

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Frontispiece:—A hasty emplacement excavated in a fold of the ground. Note leaves spread about to conceal fresh-turned earth from observation.

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THE COLT GUN AND HOW TO HANDLE THE MACHINE GUN SECTION

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INTRODUCTION

The object of this little work is to condense into brief form the information contained in the Official and other text books on the Machine Gun, to simplify the handbooks and notes issued by the Colt Factory, and more particularly the excellent work on the subject by Captain C. P. Applin, D.S.O. It is hoped by the author that by these methods, together with the practical experience gained in the training of a Gun Section, that the work will prove of use to those officers, N.C.O.'s and men who may be interested in the subject.

There are many valuable works applicable to the Maxim Gun, the type used by both the British and German forces, these apply also to a large extent to the Colt and other Machine Guns, but the mechanism, action and construction being different in the latter, it has to be dealt with separately. It is felt by the author that a work dealing exclusively with the gun adopted by the Dominion Forces will be of more interest to Canadian Soldiers than one which does not so particularise. It is felt also that the Official Text Books referred to above do not sufficiently specialise in the particular training for the men handling the Colt Automatic Gun, the information contained in them applying more to the gun in use by the British Forces. As the training of a Gun Crew is of even more importance than is the Gun itself, too much stress cannot be laid upon the specialisation in this branch of our military effectiveness.

CHAPTER I.

CHARACTERISTICS OF MACHINE GUNS

Machine Guns, although invented some years ago, have not been appreciated at their full value until recently. During the present war the great utility of this weapon has been demonstrated by the Germans to our great disadvantage. If the British authorities have not hitherto attached great importance to machine guns, their laxity may be explained by the difficulty they experienced in making them reliable. Later, however, it has been found that if handled by thoroughly experienced men, the modern and improved Maxim or Colt Machine Guns are as accurate in fulfilling their functions as any other kind of specialised machinery.

In South Africa on one occasion, a Machine Gun was brought into action, fired a few shots, jammed and was immediately taken into the base and locked up with the band instruments. This sort of thing has led many C.O.'s to consider their Machine Gun Sections much as they might their first line transport, "a necessary incumbrance," and consequently until Machine Gunners can show that they are efficient and to be relied upon, they are liable to have an uphill climb, though it is gradually becoming felt throughout the Army that the Machine Gun Section is the most important part of the Battalion or Regiment.

There are various patterns of Machine Guns which may be divided into two classes.

1. Those guns operated by recoil, caused by the explosion of the cartridge, termed "Recoil Action Guns" of which may be mentioned the Maxim, Perino and Madsen.

2. Those guns operated by the spent gases in the barrel, after their force has been utilized on the bullet, called "Gas Pressure" action guns, of which may be mentioned the Lewis, Colt, Schwarlose, Hotchkiss and Skoda.

Some years ago a Shoulder Machine Gun called the Rexar, weighing 17½ lbs., was introduced, but it did not prove a success, unlike the now popular Lewis Gun, which is also a shoulder gun, and has been adopted by the British Government, and is giving great satisfaction.

There are three methods of loading: 1. By means of a belt in which the cartridges are inserted and are drawn by the mechanism through the Gun. 2. "Spring Clip," by which the cartridges are fed to the Gun by means of a spring in the clip which forces them forward as they are used. 3. "Hopper," by which the cartridges feed themselves.

The modern Machine Gun may be said to be equal in fire effect to about 50 rifles, and has many advantages over the rifle; in fact in summing up the advantages and the disadvantages, we find the former greatly outweigh the latter.

ADVANTAGES

Fire Effect.—The range of the Machine Gun may be said to be that of the Rifle, and is equal if not superior to at least 50 Rifles. In a recent test in South Africa, 42 marksmen firing 408 rounds, secured 62 hits; against this a Machine Gun firing only 228 rounds, secured 69 hits. The rate of fire of the marksmen was slow aimed; the Machine Gun used rapid fire.

Whereas rapid fire is less trying to the Machine Gunner than "Deliberate," Rapid Fire for Infantry, "15 rounds per minute," is very exhausting,

and can only be maintained for a very short time, about 4 minutes if the troops are fresh, and 1 to 2 minutes if tired,—after that time it becomes wild and ineffective.

The fire of a Machine Gun is about twice as concentrated as that of riflemen as regards both the lateral spread and the depth of the cone of fire, and if the range is correct, and the Gun properly handled, this is an enormous advantage, as we are enabled to cover a piece of ground so that nothing can live on it.

1. **Fire Effect.**—Maxim Gunners enable Commanders to develop a maximum volume of fire from a minimum frontage.

2. **Fire Control.**—The importance of which cannot be too greatly emphasized, is easily handled by the Machine Gunner, by merely withdrawing the finger from the Trigger (or Double Button). fire immediately ceases, and by pressing the Trigger, is as readily re-opened. Fire can be distributed vertically or laterally by means of the Elevating Wheel or Clamps.

3. **Visibility.**—May be said to be that of a file of men (a front rank and his rear rank man). A man kneeling and aiming with his Rifle is practically as conspicuous as a No. 1 sitting down and manipulating his Machine Gun.

4. **Vulnerability.**—Owing to all the men of a Gun Section being trained to carry out the several duties of the various numbers; it may be said that a Machine Gun Section is unaffected by a 66% loss in casualties. Again, if the Gun is well concealed, which is usually quite a simple matter, it offers just as difficult a target as a rifle man.

5. **Mobility.**—Wherever Infantry can go they can take a Machine Gun, therefore it may be said that the Mobility of the Machine Gun with In-

fantry is that of Infantry. When mounted on a pack, it is that of Cavalry, or when in the Limbered Waggon, may be taken wherever the Waggon goes; thus confirming General Alderson's expressed opinion after the South African War, "The value of the Machine Gun is more than doubled if mounted on a pack."

6. **Frontage.**—A Machine Gunner requires from 4 to 6 ft. frontage, or about double that of a rifle man. From this small space it can deliver a fire equal to about 50 rifle men, who would occupy from 25 to 30 times more frontage.

COMPARATIVE DISADVANTAGES

In one sense it is defenceless when packed in the Limbered Waggon, to counteract which, all Machine Gunners should carry rifles, and the Officers and N.C.O.'s revolvers.

2. Owing to its concentrated fire a careless Gunner may waste ammunition by firing over or under the mark, though it is hardly ever necessary to fire more than 10 continuous rounds to observe the strike of the bullets. In sandy soil a single shot may often be observed, and once on the target an experienced Gunner should be able to keep there.

3. The peculiar noise of the automatic firing can easily be detected, and even with intermittent firing this cannot be disguised to an appreciable extent, hence the importance of concealment.

*4. I.T. says (the mechanism is subject to temporary interruption), this does not apply as much now as formerly, failures and stoppages rarely should occur if the Section has had the proper training, and have a full complement of "Spare Parts."

*Infantry Training, 1914.

DISCIPLINE AND SELECTION OF MEN

ESTABLISHMENT OF MACHINE GUN SECTION

A few preliminary remarks regarding some of the essentials of a good Gun Section may not be out of place.

Although we are all constantly talking of discipline, how often do we see it? In discipline there can be no half measures, and it will be found that the easiest, simplest and happiest method of securing it is to insist on obedience in the minutest detail. It takes a soldier a surprisingly short time to discover that he is happier under rigid, than under lax discipline. For instance: all soldiers know that talking in the ranks is forbidden, but if they know also there is a fairly good chance of them escaping detection, or if discovered, of escaping punishment, they are naturally inclined to take the risk and talk. On the other hand if they know that their N.C.O.'s are on the alert and that if found talking they will be punished, they remain silent. Let your discipline therefore be rigid and unrelenting and it will be better for all concerned.

Officers should avoid familiarity with N.C.O.'s and should not encourage it between N.C.O.'s and men, as it has been truly said—"It breeds contempt."

All commands must be given in a clear, decisive, authoritative tone of voice. You may have noticed a squad of men turned over to an incompetent N.C.O. or man to practice on for a few minutes. What is the result?—invariably they become "slovenly and inattentive"—then the competent man takes over the squad and it will be noticed that immediately they become attentive and smart. This is merely

human nature. Don't shout your orders, don't bawl them. The word "bark" expresses fairly well how a command should be given. If you want a well disciplined, orderly, smart, set of men, you will find that a good word of command is one of the essentials. An excellent plan for newly appointed Officers and N.C.O.'s is to go somewhere by themselves and practice giving commands.

N.C.O.'s as all know have been described as the back bone of the British Army. Today an Officer is expected to be more practical than a few years ago, but the efficiency of the Officer should in no way diminish the importance of the Sergeants who should act in many ways as the mouth piece of the Officer, and the Sergeants in their turn again have their subordinate N.C.O.'s who each have their respective task and should know it thoroughly.

Great care should be exercised in appointing N.C.O.'s, especially in the Machine Gun Section as Junior Lance Corporals after the first engagement entered into, may become the Commander of the Machine Gun Section (should the Officer and Senior N.C.O.'s become casualties.). In selecting a Private for promotion, some of the most important points to be observed are: that he is appreciated amongst the men, will not be a bully, but will be firm, and is a good example. An immoral and foul mouthed N.C.O. is never appreciated by soldiers, who are in many respects like boys and like to look up to those set over them. It should never be thought too much trouble to do anything, when it concerns the comfort of the men, when they are entitled to it.

The Machine Gun Section, although forming an integral part of the Battalion, must be trained separately. The Machine Gun Officer is directly responsible to the Commanding Officer, who will,

through the medium of the Machine Gun Officer, direct the training of the Section. It is thus very important that Commanding Officers should be well informed of the requirements and tactical uses of a Machine Gun Section.

Although occasional route marches and manoeuvres with the Battalion are highly advisable, it is better for the Machine Gun Section to be independent (except on special occasions) of the Battalion parades. Much valuable time is lost in "falling in," and possibly useless formations and drill, which will be of no possible service to them, for it must be remembered, as Capt. A. P. Birchall in his excellent little book, "Rapid Training of a Company for War," so aptly puts it: "Drill is liable to be made a God of by non-regular troops. It should be regarded merely as a means to an end and not an end in itself."

When possible the Machine Gun Section should always do at least half an hour's physical drill, and half an hour's flag drill during the day.

The Machine Gun Section is exempt from all guards, escorts, fatigues, pickets, etc., as it is imperative that the men should not miss any item in the long and miscellaneous training which they have to go through, as through being absent from some lecture or particular part of the instruction, this may give rise to a serious mistake in the future. This exemption may at first cause petty jealousy, but in view of the important nature of their work, their general efficiency, and other qualifications not required by the Company soldier, this can readily be understood.

The usual and best method for the selection of the Machine Gun Section is as follows:

The Officer Commanding announces on Battalion Parade that the Machine Gun Officer will be calling

for volunteers and selecting from them the men for the Machine Gun Section. He will perhaps also comment upon the importance of this work. The following day the Machine Gun Officer approaches each Company separately and calls for Volunteers, selecting from each Company as nearly as possible an equal number of men. In the aggregate he selects the most suitable 50 or 60 men. During the next month, having given them all a fair trial, he weeds out those who are less fitted for the work, carefully keeping a record of their capabilities for future reference so that they may be used as a Reserve Machine Gun Section or to replace casualties. In selecting men the following qualifications, whenever possible, should be insisted upon: 1. Men of fair education. 2. Trained Company soldiers of good physique. 3. Marksmen. 4. Calm temperament. 5. Good eye sight. 6. Mechanical aptitude. 7. Young men of about 25 to 35 (a young man is far easier taught than an old).

ESTABLISHMENT OF MACHINE GUN SECTION

1915

Lieutenants	1
Sergeants	2
Corporals	1
*Lance Corporals	4
Privates	20
Drivers	6
Batmen	1
<hr/>	
Total all Ranks	35

*Not in establishment but optional.

- 2 G.S. Limbered Waggons for Machine Guns and Ammunition.
- 2 S.A.A. Carts for Ammunition only.
- 4 Pack Saddles for Ammunition, carried in Limbered Waggons.

Horses—

- 8 Horses for Limbered Waggons.
- 4 Horses for S.A.A. Carts.
- 1 Saddle Horse for Machine Gun Officer.

13 Total.

Armament, Equipment Issue—

- 4 Machine Guns together with Tripods, Belt Filling Machines, Spare Parts, etc.
- 35 Rifles, together with Bayonets,
- *2 Range Finders.
- *3 Binoculars and Compasses for N.C.O.'s
- *3 Revolvers
- *4 Pair Signalling Flags.
- *This issue is pending approval.

Note.—The 1916 Establishment differs from the above, and in January, 1916, introduces a Brigade Machine Gun Company, comprising 9 Officers, 10 Sergeants, 1 Transport Sergeant, 1 Armourer Sergeant, 1 Sergeant Major and 152 men, 9 Riding Horses and 36 Draught Horses.

THE TRAINING OF A MACHINE SECTION

It should be first ascertained that all men thoroughly understand discipline, and the duties of a Private Soldier, in so far as: interior economy, guards, picquets, etc., squad, section, battalion, extended order drill, musketry and bayonet fighting are concerned.

Having got the required stamp of man, it is now required to make him an efficient Machine Gunner, and in order to be such, he should qualify in the following:

Target Practice.

Stripping.

Judging Distance.

Immediate Action (when a stoppage occurs).

Care of Arms.

Aiming Off for Wind.

Signalling (preferably Morse).

Drill.

Mounting and Dismounting, etc.

Night Firing.

Belt Filling by Hand and Machine.

Tactical Handling.

Theory.

Scouting and Map Reading.

The course of training should be drawn out to proper schedule and should be adhered to as far as possible.

Lectures in the form of demonstrative talks, should be given 4 or 5 times per week. Care should be exercised in preventing men getting disinterested by repetitions of the same subject in proximity to one another. It must be always borne in mind that the poorest man, in so far as Machine Gun qualifications are concerned, may, by virtue of casualties, become in charge of a Machine Gun Section, and for this reason great care and time should be exercised on such men, and, provided they are willing and anxious to get on, such time is well spent.

Target Practice.—The principal object in view during the training of a Machine Gunner is to make him competent to skilfully manipulate, aim and fire a Machine Gun. Without accuracy, and

skilful handling, a Machine Gun is a menace to neighbouring troops. Target practice, with ball ammunition, is the only thing which can teach this effectively, and the more practice that can be had the better. To avoid waste of ammunition a lot of preliminary instruction in aiming (tapping) should be given on an instructional target, afterwards the practices as laid down in Table "C" should be adhered to. If the instructional targets are not procurable they may be easily made, or the ideas of the construction of the targets be carried out.

Stripping.—A very important item. Frequent Stripping is necessary in order that every number in the Machine Gun Section may be able to Strip, and Assemble a Machine Gun without hesitation, accurately, and in the least possible time. Frequent Stripping causes wear and play in mechanism, it is therefore advisable to set aside one Gun for this purpose, terming it the "Instructional Gun."

Judging Distance.—This is of great importance, as frequently range finding instruments are not procurable. Owing to the concentrated nature of Machine Gun fire, unnecessary waste of ammunition and what is sometimes of more importance, the giving away of a position, may be occasioned by lack of knowledge in this subject.

Immediate Action.—Jams may occur, and will occur, probably when least expected or when most dreaded. No fear on this point may be entertained provided the Gunner knows what to do, and how to do it. Experience again is the only master to teach this subject, though aids may be found by removing portions of the mechanism, accounting them as broken, damaging cartridges, wetting or otherwise damaging belts.

Care of Arms.—Just as the motto, “the rifle is the soldier’s best friend,” applies to the Company Soldier, so, only in a more acute sense, may the motto be applied to the Machine Gunner, as the Machine Gun is the Machine Gunner’s only friend. The Machine Gun, owing to the heat generated by its rapidity of fire, and the vast number of rounds passing through the barrel, is very subject to fouling of the worst kind. This fouling must be constantly guarded against, and careful instruction impressed on the men as to the importance of its early removal. Care of arms also covers a thorough knowledge of the correct names of all the working parts, together with a general description and weights of the principal parts of the Gun. Knowledge of the names of the “Spare Parts” when not in the Spare Parts Wallet is advisable. A thorough knowledge of the functions of the different parts of the mechanism and the forces that work them is essential.

Aiming Off for Wind.—Is the only system by which the Gunner can gauge the different effects of the different velocities of wind on the bullet, and although the wind gauge may be adjusted so that the barrel is moved over (without disturbing the aim) to overcome this, if a man cannot judge the effect of the wind on the bullet; the wind gauge is useless to him.

Signalling.—Is always useful, both in peace and war; as semaphore signalling can only be read a short distance and is not applicable to heliograph, night lamps, telegraphs or any other method; most of the signalling instruction had better be spent on Morse, though Semaphore can also be easily taught.

Drill.—The principal object of Machine Gun Drill is to make the various numbers thoroughly acquainted with their several duties, and also with

the duties of one another. Also the very important point of taking cover and remaining perfectly still when under cover. It may here be again quoted that Drill must be regarded as a means to an end and not an end in itself, though it must not be forgotten, that it is in Drill that men are taught to mount, aim, and dismount the Gun neatly and rapidly. Drill over rough country is very exhausting, and is essential to teach men to acquire mobility for their gun, without which knowledge, a Gun Crew could be seriously hampered in either attack or defence.

Mounting and Dismounting.—As above mentioned this is important and should be carried out as laid down elsewhere.

Night Firing.—Should be practiced occasionally until it is felt that under active conditions the Night Firing Box may be utilized with accuracy.

Belt Filling By Hand.—Owing to the possibility of the Belt Filling Machine getting out of order, all numbers should have frequent practice in Belt Filling By Hand. No particular system may be laid down, but some definite system should be taught and adhered to. The importance of quick, and even Belt Filling cannot be dwelt upon too heavily. A Machine Gun without a Belt loaded properly is worse than useless.

Belt Filling By Machine.—The only method adopted in the Filling of a Belt when the Machine is in working order, and owing to the simplicity of its construction, this is happily usually the case. The Belt Loading Machine, perhaps, as it is not indispensable, is liable not to receive the attention that is due it. Care should be taken to avoid this, and every number in the Section should thoroughly understand how to work it, its principal parts, and their functions.

Tactical Handling.—The more advanced part of

the training of the Section. This is one of the most important parts of the training of the Machine Gun Section, and every effort should be made for the Machine Gun Section to be utilized in conjunction with other troops in tactical schemes. By this it is not proposed that the Machine Gun Section should be placed with the Reserve and never utilized, or on the march placed in the rear of the Battalion, where a considerable amount of time may be lost before they can come into action. Nor in the defence, kept with the General Reserve, without having previously had opportunity to make their alternative emplacements. It is here that the full importance of the taking and making of cover, and operation by surprise can be demonstrated.

Theory.—Theoretical knowledge (although inferior), is a great aid to practical knowledge, and the Section should have frequent lectures on the theory of Fire and of Tactics generally. As hitherto mentioned, the trajectory of the bullet at the principal ranges should be memorized.

Map Reading.—All numbers should have a general knowledge of Map Reading, and should be able to make a more or less comprehensive Map to a rough scale.

Scouting.—The Numbers 5 must be trained Scouts; theirs is a very important role, and a Machine Gun Scout, besides having the ordinary Scout's accomplishments, must be able to make a good map, write a comprehensive report, be a keen observer, and be able to locate quickly any fold or hollow in the ground which might make a suitable Gun Position, his eye sight should be such that he can see a long way, as binoculars should only be used to verify what has been seen by the natural eye sight, and to pick out details. It is essential that a Scout has excellent hearing.

CHAPTER II.

ALLOCATION OF DUTIES

PARTICULAR DUTIES ALLOTTED TO THE MACHINE GUN OFFICER, SERGEANTS AND CORPORALS OF THE MACHINE GUN SECTION.

The Officer—

1. Previous to the Gun coming into action he will select roughly the position to be taken up by each Gun—one of the Sergeants or Scouts finally selecting the position.
2. He points out the actual object against which the fire is to be directed, using when unavoidable the clock face method, brevity being of first consideration.
3. Having previously ordered the range to be taken by the Numbers 6.
4. He gives the volume and nature of fire to be employed.
5. He gives the sighting elevation.
6. At the right moment orders the opening of fire, controlling it, observing the strike of the bullets, and correcting the elevation or altering the direction as may be necessary.
7. At all times he keeps a look out on the varying phases of the tactical situation, so that the gun positions may be altered if not being used to full advantage.
8. If the Guns are Brigaded, he must remember that the B.M.G.O. is operating his Section through him and must be on the "qui vive" for signals and orders from the B.M.G.O.

9. He must always remember that Machine Guns without an adequate supply of ammunition are worse than defenceless and a thorough knowledge of the supply in hand and the source for a future supply should be known.

10. In the event of it becoming necessary to abandon Guns he will see that they are rendered useless, in the event of them falling into the enemy's hands. The quickest way to do this is to remove the Handle and break off the Back Sight.

The Sergeants—

1. They select the actual position on which Guns are to be mounted and generally superintend their mounting and coming into action, and taking care that all Numbers of Crews are conversant with the proposed action, and their own particular share in it, also giving any assistance where necessary.

2. They should be kept informed of all orders and information received by the Machine Gun Officer and be thoroughly conversant with the proposed action and tactical situation, as, should the Machine Gun Officer become a casualty the Senior Sergeant has to take his place and command the Machine Gun Section until further instructions.

Corporal—

The Corporal is perhaps the busiest man in the Section, his duties cover:

1. The packing and unpacking of the Limbered Waggons, and seeing that no confusion occurs should this have to be done in a hurry; he also sees that the Waggons are placed under the nearest cover available.

2. It is he that sees the Guns never lack ammunition, and that the Belts are properly and

evenly loaded, and that they are mended when worn or badly frayed.

3. He also is in charge of the Tools and Appurtenances for the making of artificial cover and attends to its preparation.

4. Should the Officer and Sergeants become casualties he will take over the command of the Section, so should be cognisant of the same information as received and understood by the Sergeants.

No. 1 is the most important man in the Gun Section, as it is he who aims, fires and operates the Gun. It should take a long time to decide who should hold this important position, as one man who may be by far the best shot might be a poor mechanician, and one who might have both these qualifications might not be a powerful enough man to handle the Tripod, and one who might embrace all three of the above qualities, might not have a sufficiently active brain to immediately comprehend an order and act on it, so it is best to delay the final selection of the Nos. 1.

If the 4 Nos. 1 of the Section appear to make suitable N.C.O.'s, a good plan is to make them Lance Corporals which gives them some authority over the remainder of the crews, and they should be made responsible for the Care and Cleaning of the Gun.

No. 1. 1. Is responsible for the correct mounting of the Tripod. He must see that the Bed of the Saddle is level and when on uneven ground, must see that the Traverse keeps horizontal when moved sideways.

2. He repeats all orders received.

3. When possible, and when at short ranges, he observes his own fire, and, if "short" or "over"

alters the elevation, never "carrying on," when he can see that the elevation is wrong without both reporting and correcting it.

No. 2 should be picked as the next best man to No. 1, in order to replace him if necessary.

1. He sees that the Gun is in good order, and carries it to the Tripod; when possible, he assists No. 1 in the mounting.

2. He assures himself, that the Belts are evenly loaded and that no more than one-eighth and not less than one-sixteenth of the brass cartridge is showing through the Belt. He sees that there are no obstructions in the Box and that the Belt is laid properly therein.

3. He sees that the Belt and Boxes are as far as possible kept dry, as a wet Belt is a fruitful source of jamming.

4. At long ranges he will observe the fire of the Gun, and reports to No. 1.

5. He assists No. 1 in every way, and keeps a keen lookout for all signals and orders from the Brigade or Section Officer.

6. He assists No. 1 in cleaning, and during firing keeps the Oil Can near at hand to oil the visible frictional parts.

7. He works the Gas Lever twice on unloading.

No. 3 acts as a connecting file between the Belt Filler and the Gun, all the ammunition in Belts pass through his hands and he may also be used as a messenger to carry back damaged parts and return with repairs, etc.

No. 4 carries the ammunition to No 3., and attends to the repairing of mechanism when possible.

No. 5 is the Scout and is utilized as such when occasion demands. He will be placed in the most suitable position to command a good view of the right or left, front or rear, flank. He should be a good signaller and conversant with all methods of signalling and know how to write a message. He should know how to see without being seen.

No. 6 is the Range Taker. He will be chosen for his ability to judge distance. He should have a thorough knowledge of the particular kind of "Range Taker" he is issued with, and must understand that an error of 50 yards in his estimate of a distance under 1,300 yards is unpardonable.

We have now accounted for 1 Officer, 2 Sergeants, 1 Corporal and 4 Crews of 6 Men. There remain 7 Men from the total establishment of 35 unaccounted for, of these, 6 are Drivers and 1 the Officer's Batman.

These six should be of the pioneer stamp and capable of repairing harness, extricating a waggon when stuck in marshy land, improvising repairs, and repairing waggons, etc. They should be good horsemen, and at any moment be able to replace a casualty in a Gun Crew and so should have an equal amount of training and practice in firing as the remainder of the Section.

There remains the Batman, who in the first place should be a trained soldier, and should have had as much practice with the Guns as possible.

The great idea to be kept before the Machine Gun Section is that, as long as there remains one man for each Gun out of the original 35, although handicapped in the matter of ammunition supply, the Guns should be capable of "carrying on," and in order to achieve this each man must receive an all round education in the duties of the various numbers.

DRILL

The Machine Gun Section will fall in in two ranks with the Nos. 1 of the Crews, 2 and 4 covering No. 6, of the crews 1 and 3 respectively. The Nos. 1 with the Tripod closed up standing on its rear legs by their sides. Nos. 2 with the Guns Bottom Plate facing outwards with the Muzzles resting on their left feet. Nos. 3 with the Ammunition Boxes under their left arm, Brass Tabs hanging out of the Box. Nos. 4 with the Ammunition Boxes under their left arm. Nos. 5 with Semaphore Flags in the right hand at the attention position. No. 6 with Range Taker if procurable. The Senior Sergeant on the right, the Junior Sergeant on the left, the Corporal in the rear. In this formation they will be numbered and proved in fours, and this formation will be their normal formation for any movement other than Inspection Drill.

INSPECTION DRILL

The following method has been found the most satisfactory in practice:

On the command **Fall in** the whole will move simultaneously at the double, Nos. 1 and 2 of No. 1 Crew placing the Gun and Tripod respectively 5 paces in front of where they fall in. Nos. 1 and 2 of No. 2 Crew placing their Gun and Tripod not more than 10 paces to the left of No. 1 Crew. The Nos. 1 and 2 of 3 and 4 Crews acting similarly. The Nos. 3 will place their Ammunition Boxes 5 paces in the rear of their Guns. Nos. 4 placing their Ammunition Boxes 5 paces in rear of their respective Nos. 3. Nos. 5 and 6 will retain their respective Flags and Range Finders.

As soon as the various material has been correctly placed and without further word of command the whole fall in at "attention" in double Crews, Nos. 1—6 forming No. 1 Crew, their rear rank men forming No. 2 Crew Nos. 7—12, No. 3 Crew, their rear rank men forming No. 4 Crew.

Nos. 1 and 2 Crews fall in, in two ranks (No. 2 Crew forming the rear rank) five paces in front of the interval between No. 1 and 2 Guns. Nos. 3 and 4 Crews act similarly.

The Senior Sergeant placing himself on the right of No. 1 Crew.

The Junior Sergeant placing himself on the right of No. 3 Crew.

The Corporal placing himself on the right of No. 2 Crew.

On the Command by Crews Number.—The whole number, Nos. 1 and 3 crews numbering from right to left, Nos. 2 and 4 Crews from left to right.

On the Command Tell Off by Crews.—The Nos. 1 of each Crew call out in rotation the numbers of their respective Crews.

On the Command Take Post.—The whole turn outwards, the odd numbered Crews turning to the right, the even numbered Crews turning to the left, and both doubling to their respective places, round the flanks of their Guns, keeping in file until nearly opposite their respective positions when they break away and as soon as they reach their positions lie down.

Nos. 1 and 2 lie on the left of the Tripod and the right of the Gun, respectively. Nos. 3 on the left of the Ammunition Box, 5 paces in the rear of the Gun. No. 4 on the left of the Ammunition Box, 5 paces in rear of No. 3. Nos. 5 (the Scouts) double out about 20 paces on the flanks,

No. 1 Crew's Scout to the right front, No. 2's Scout to the right rear, No. 3's to the left front, No. 4's to the left rear. Nos. 6 will be in line with the Nos. 4 as will also any spare men.

The Senior Sergeant will place himself in line with and between Nos. 1 and 2 Guns. The Junior Sergeant will place himself in line with and between Nos. 3 and 4 Guns. The Corporal will be in line and between the Nos. 4 of Nos. 2 and 3 Guns, in these positions the whole Section will remain lying without any movement.

On the Command Mount Gun.—No. 1 immediately seizes the Tripod under his right arm and doubles out 5 paces to his front. By allowing the Rear Leg to drag just before reaching his position and seizing the Saddle of the Tripod with the right hand, releasing his hold with the left, the Front Legs of the Tripod swing outwards, at the same time he straddles the Rear Leg, and leaning forwards seizes the Front Legs in the right and left hands, they may then be easily placed in their proper position. Just before the Tripod is placed, No. 2 seizes the Gun under his left arm, Muzzle to the rear, and doubles out to the left side of the Tripod, when reaching the Tripod he turns to the right, and sinking down on his right knee, rests the Gun on the left knee. He then places it in the Saddle with the Gun Pin Hole in the rear of the Holes in the Saddle, he then places the Gun Pin, handle uppermost, through the Hole on the left side of the Saddle, pushing inwards onto the Side Plate of the Gun. No. 2 now taps the Gun forward until the Gun Pin engages the Hole in the Side Plate and slides it in through to the other side, turning the handle down and locking it. Just before this is completed, No. 3 doubles up with the Ammunition Box and gives it to No. 2 who places it in its position on the left of the

Tripod. No. 3 then retires to his new position, 5 paces in the rear of the Gun. Just before No. 3 lies down in his new position, No. 4 doubles up and gives him a New Box of Ammunition and in turn doubles back to his new position, 5 paces in rear of No. 4, all numbers, with the exception of Nos. 1 and 2, who are respectively sitting on the Saddle and kneeling at its side, should now be lying down motionless.

On the Command Load.—No. 2 places the Brass Tab of the Belt through the Aperture on the left of the Gun, No. 1 seizes it with his right hand pulling it through with a smart upward and forward jerk until the first cartridge becomes engaged in the Feed Wheel. He then releases the Belt with the right hand, seizes the Gas Lever Pin and draws it downwards and backwards until it touches the Bottom Plate, when it is released and allowed to snap back into its position. During this motion, with his left hand he raises the Leaf of the Sight. The Gun is now loaded, which is signified by the kneeling No. 2 raising his left hand, resting the elbow on the left knee, remaining in this position until the order to fire is given.

On the object being named, the method of fire required and the range given, No. 1 repeats the command verbatim, and adjusts the Sight.

On the Command Fire.—No. 1 presses the Trigger, keeping the pressure on until the required number of rounds have been fired.

On the Command Cease Fire.—No. 1 releases the Trigger and pushes forward the Safety Catch.

On the Command Unload.—No. 1 slides forward the Feed Throw Off Screw on the Right Side Plate with his fore finger thus releasing the Pawl and Dog from the Feed Wheel, and with his left hand lowers the Sight. No. 2 now withdraws the Belt

and then operates the Gas Lever twice to ensure there being no cartridges left in the Chamber. The live round which is ejected is picked up by No. 1 and replaced in the Ammunition Box.

On the Command Dismount Gun.—No. 2 takes off the Ammunition Box and hands it to No. 3 who doubles up to the Gun to receive it. No. 1 withdraws the Gun Pin and No. 2 seizes the Gun in the proper manner and doubles 5 paces in rear. No. 1 now replaces and locks Gun Pin, tightens the Clamps, and picking up the Tripod, doubles to his position by the side of No. 2. In the meantime No. 4 has removed the Spare Ammunition Box left by No. 3 when doubling up to the Gun.

FIELD TRAINING

When the Guns are mounted and in position they may easily assume any formation, by being moved in the "Carrying Position" brought about by first unloading, and then No. 1 swinging the Gun round to the left, at right angles to the front and clamping it there. No. 2 now steps between the Front Legs of the Tripod with his back to No. 1 and stooping down seizes the Legs of the Tripod as near its feet as possible, he now raises himself and lifts the Gun, at the same time No. 1 seizes the Rear Leg of the Tripod, lifting it and steadying the balance, the Gun is now in the "Carrying Position," and may be moved anywhere without the loss of time occasioned by mounting and dismounting.

On the signal to "Advance," or 1 cautionary and 5 blasts of the whistle, the Guns are placed in the "Carrying Position," and taking the time and dressing from the right, the whole move forward at the double, keeping their correct intervals and distances.

On the signal "To Halt" or 1 blast of the whistle, the Guns are placed on the ground and immediately swung to the front, by loosening the Traversing Clamps, Nos. 1 and 2 assuming their proper positions as in "Mount Gun."

An echelon formation from the right may easily be carried out by the 1 cautionary, 5 short, and 1 long blast of the whistle any convenient distance and interval being previously stated.

Echelon from the left is carried out by one cautionary, 5 short, and 2 long blasts of the whistle.

When in Line on the Command "Action Right."—Or the signal Right Wheel, or 1 cautionary and 2 short blasts of the whistle, the right hand Gun will make a full turn to the right. the remainder will double up into line at right angles to previous front, facing right, dressing by the right hand Gun.

On the Command "Action Left."—Or the signal Left Wheel, or 1 cautionary and 3 short blasts of the whistle, the left hand Gun will make a full turn to the left, the remainder acting as above. though dressing by, and facing the left.

On the Command "Action Rear."—Or the retire signal or 1 cautionary and 4 short blasts of the whistle, the Guns will be turned about, the remaining numbers doubling to their respective places in rear facing the new front. The direction in which the Guns are facing (be it to the right, left or rear of the original front) is always the front.

When Guns are facing the rear and it is desired that they should face the original front the Command "Action Rear," or 1 cautionary and 4 short blasts of the whistle will be given.

MOVEMENTS WHEN IN COLUMN OF FOURS

The Section will be fallen in as when fallen in preparatory to Inspection Drill

On the Command "Form Fours"—The whole will act as directed. Those men in the rear of No 1 picking up the Rear Leg of the Tripod, and in the case of the No. 4 Crew **only**, the fore part of the Tripod being carried by Nos. 3 and 4 of that Crew, No. 1 carrying the Rear Leg.

On the Command "Action Front."—Or 1 cautionary and 1 short blast, No. 1 Gun will be mounted on its own ground, the remainder breaking away, and mounting guns on the left of No. 1, and at right angles to the direction the column was marching in. Guns and men assuming precisely the same positions as on the command "Mount Gun."

On the Command "Action Right."—Or 1 cautionary and 2 short blasts, No. 1 Gun will be mounted on its own ground facing the right, the remainder will double back to get their correct intervals and all assume the "Mount Gun Position" facing right.

On the Command "Action Left."—Or 1 cautionary and 3 short blasts, the whole will act as above, facing left.

On the Command "Action Rear."—Or 1 cautionary and 4 short blasts, the whole turn about, No. 4 Gun is set up on its own ground, the remainder doubling into the new alignment on its left, if the Guns are now turned about it will be seen that they are in their proper positions No. 1 on the right. When occupying a frontage, should it be desired to move over to the right or left, two "incline" signals should be given when the Sections

will move to the right or left in file without changing their relative positions. Should it be desired to move forward again in fours, the signal to close on the centre, right or left, may be given, when the Section will fall in in fours facing the same front that they last occupied.

Vanishing Action.—Though not a drill movement, can be utilized as such and is perhaps the only action in which cover and concealment are not attempted and can only be carried out with success under certain conditions, the principal one being that the enemy's fire is not at close range.

Bringing the Section in fours behind cover of a hill, the command "Action Right" or "Left" as the case may be, should be given. They are now facing the hill or rising ground. The Machine Gun Officer now cautiously approaches the summit of the hill, reconnoitres the situation, and selects approximate positions for the Guns, which positions he points out to the 4 Scouts, who, accompanied by the Range Takers, move forward independently, cautiously select the actual positions for their respective Guns—coming back behind the cover, they place their respective Guns immediately in rear of the selected positions, the Range Takers coming back to report the range of the enemy's position. When all preparations are made and Guns in "Carrying Position," and loaded, the Machine Gun Officer creeps forward and watches for a favorable opportunity, when by a pre-arranged signal of the whistle, the whole rush forward and open fire, at another signal from the Machine Gun Officer they go out of action behind the hill and take cover before the enemy's artillery have had time to pick up the range. At the double incline signal they double off in file down the valley or behind the cover utilized.

WHISTLE SIGNALS

Always preceded by one cautionary blast---

1 Short blast, signal for "Action Front."

2 Short blasts, signal for "Action Right."

3 Short blasts, signal for "Action Left."

4 Short blasts, signal for "Action Rear."

5 Short blasts, signal for "Advance."

5 Short and 1 long, signal for "Advance in Echelon from the Right."

5 Short and 2 long, signal for "Advance in Echelon from the Left."

1 Long blast, unaccompanied by a cautionary blast, signal for "Halt."

CHAPTER III.

THE "COLT" AUTOMATIC GUN

DESCRIPTION, ACTION AND MECHANISM

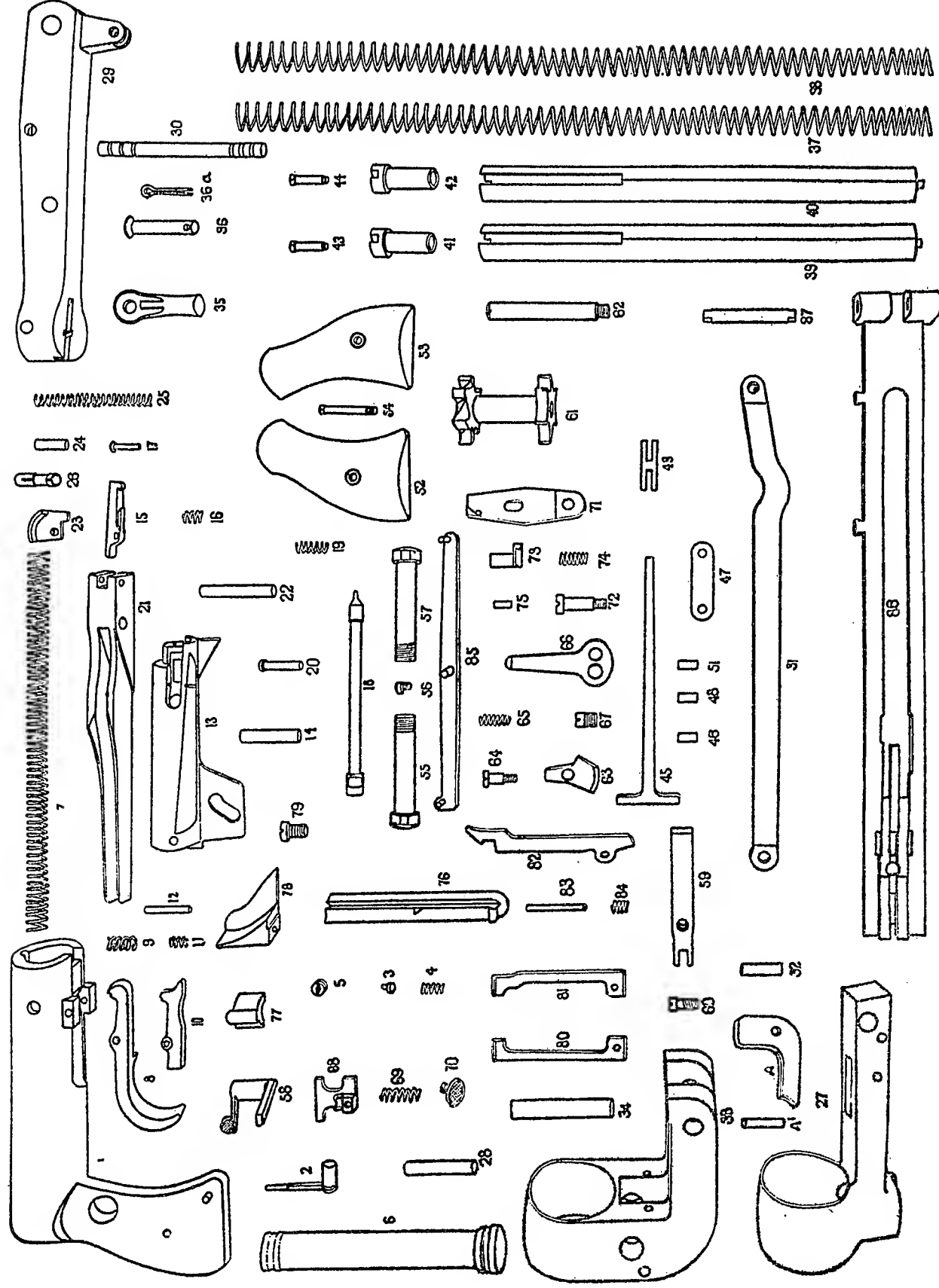
The Mount.—Consists of a powerful Tripod weighing about 60 lbs., the Legs of the Tripod are of tubular steel with a Foot and Spike attached to prevent any movement when set up. On the Rear End Leg is a Seat for the Firer which can be adjusted as necessary for his comfort; a big man uses the Seat about 8 inches up from the Foot of the Leg and a short man about 10 inches up. The flat portion on which the Gun rests is termed the "Saddle," attached to this is a Toothed Arc,

which is operated by a Worm Gear turned by the Hand Wheel, it causes a maximum elevation of 31° or depression of 39° . The Elevating Clamp, passing through the Yoke when tightened renders the Gun immovable vertically. The Arc is suspended by the Yoke, the lower parts of which rest on the Platform and Socket of the Tripod, thus enabling the Gun to be traversed a full circle. The Traversing Clamp when tightly screwed, grips the Spindle, and renders the Gun immovable laterally. A Lock Screw passing through the Bed of the Saddle, enables any play caused by wear, etc., to be taken up by means of raising the head of the Screw. A Screw in the Forward End of the Shank of the Hand Wheel, enables any slackness in the Handle caused by wear on the Worm Gear to be partially obviated. The Chain attaching the Gun Pin to the Tripod will be found very weak for that purpose, and frequently causes the loss of the Gun Pin through breakage; consequently it is advisable to secure the Gun Pin to the Tripod by means of a very much stouter Chain. It is advisable occasionally, to clean out the Gears and all Frictional Parts of the Tripod as an accumulation of grit will cause wear. It will be found also that perspiration from hands touching the Legs of the Tripod will cause red rust to appear, which may be avoided by daily wiping the Legs with an oily rag.

The Gun weighs 35 lbs. Its mechanism is encased at the rear end by the "Receiver" and forward of this by the Bottom Plate, two Side Plates and Barrel. A Hole passing through the two Side Plates at the point of balance is the only means by which the Gun is attached to the Mount. It is adjusted so that the normal rate of fire is 450 rounds per minute.

AUTOMATIC ACTION

The Barrel, 28 inches long, weighs about 10¾ lbs., and is corrugated, forming Radiators which assist in delaying the heating of the Barrel. At the forward end of the Barrel is the Foresight, attached by means of a Sheath which is riveted onto the Barrel. Attached to the Sheath is the Foresight Block and Blade, the bottom of the Block is moulded into the form of a key which fits into the Keyway cut in the Sheath for its reception and held there by means of a Set Screw. By loosening this Screw the Foresight can be adjusted laterally or allow for drift. The Hood Covering is attached to the Block by means of two Screws. The Bore is rifled by means of 4 spiral grooves from left to right, giving a right handed twist to the bullet and one complete turn every 10½ inches. The rear end of the Barrel is threaded to screw into the Receiver. Underneath that part of the Barrel, which is held by the Gas Cylinder, there is a Hole through the thickness of the Barrel, which taps the Bore, this Hole is called the Gas Vent, and it is after the bullet, passing up the Barrel, passes over this small hole, that the Gas, having already given impetus to the bullet, finds a vent here, and forcing itself down through this hole, drives another projectile, in the form of the Gas Piston, downwards. This Piston being attached to the Gas Lever at the forward end (the rear end of the Gas Lever being attached to the Gas Lever Bracket by means of the Gas Lever Bracket Pin), drives the Lever downward and backwards until it nearly touches the Bottom Plate. Attached to the Gas Lever by means of the Gas Lever connection Pin, is the Gas Lever Connection (Rod), the other end of this is attached to the Slide by means of the Slide Pin, so that when



COMPONENT PARTS—COLT AUTOMATIC GUN

1. Handle. Lock.
2. Handle Lock and Safety Stop.
3. Handle Lock and Safety Stop Spring.
4. Handle Lock and Safety Stop Screw.
5. Hammer.
6. Main Spring.
7. Trigger.
8. Trigger Spring.
9. Sear.
10. Sear Spring.
11. Trigger and Sear Spring.
12. Bolt.
13. Bolt Pin.
14. Shell Extractor.
15. Shell Extractor Spring.
16. Shell Extractor Pin.
17. Firing Pin.
18. Firing Pin Spring.
19. Firing Pin Stop Pin.
20. Carrier.
21. Carrier Pin.
22. Carrier Dog.
23. Carrier Dog Pin.
24. Carrier Dog Spring.
25. Carrier Dog Plunger.
26. Gas Cylinder.
27. Gas Cylinder Pin.
28. Gas Lever.
29. Gas Lever Pin.
30. Gas Lever Connection.
31. Gas Lever Connection Pin.
32. Gas Lever Bracket.
33. Gas Lever Bracket Pin.
34. Gas Lever Piston.
35. Gas Lever Piston Pin.
36. Gas Lever Piston Pin Cotter Pin.
- 37-38. Retracting Springs.
39. Retracting Spring Tube, R. H.
40. Retracting Spring Tube, L. H.
- 41-42. Retracting Spring Follower.
- 43-44. Retracting Spring Tube Screws.
45. Retracting Connection Pin.
46. Retracting Connection Long Link.
47. Retracting Connection Short Link.
48. Retracting Connection Long Link Rivet.
49. Retracting Connection Short Link Rivet.
51. Rivet.

52. Stock, R. H., with Escutcheon.
53. Stock, L. H., with Escutcheon.
54. Stock Screw.
55. Front Side Plate Screw.
56. Front Side Plate View, Lock Screw.
57. Rear Side Plate Screw.
58. Safety.
59. Belt Guide.
60. Belt Guide Screw.
61. Feed Wheel and Bushing.
62. Feed Wheel Shaft.
63. Feed Wheel Dog.
64. Feed Wheel Dog Screw.
65. Feed Wheel Dog Spring.
66. Feed Lever.
67. Feed Lever Screw.
68. Feed Throw-off.
69. Feed Throw-off Spring.
70. Feed Throw-off Screw.
71. Ratchet Lever.
72. Ratchet Lever Screw.
73. Ratchet Lever Pawl.
74. Ratchet Lever Pawl Spring.
75. Ratchet Lever Pawl Pin.
76. Ejector.
77. Chamber Guide.
78. Bullet Guide.
79. Bullet Guide Screw.
80. Cartridge Guide, R. H.
81. Cartridge Guide, L. H.
82. Cartridge Extractor Pin.
83. Cartridge Extractor Pin.
84. Cartridge Extractor Spring.
85. Trip.
86. Slide.
87. Slide Pin.
88. Receiver.
89. Side Plate, R. H.
90. Side Plate, L. H.
91. Bottom Plate.
92. Barrel.
93. Front Sight.
94. Rear Sight.
- A. Barrel Lock.
- A1. Barrel Lock Pin.
- C. Combination Wrench. (Shown on plate opposite page —.

Not shown on plate.

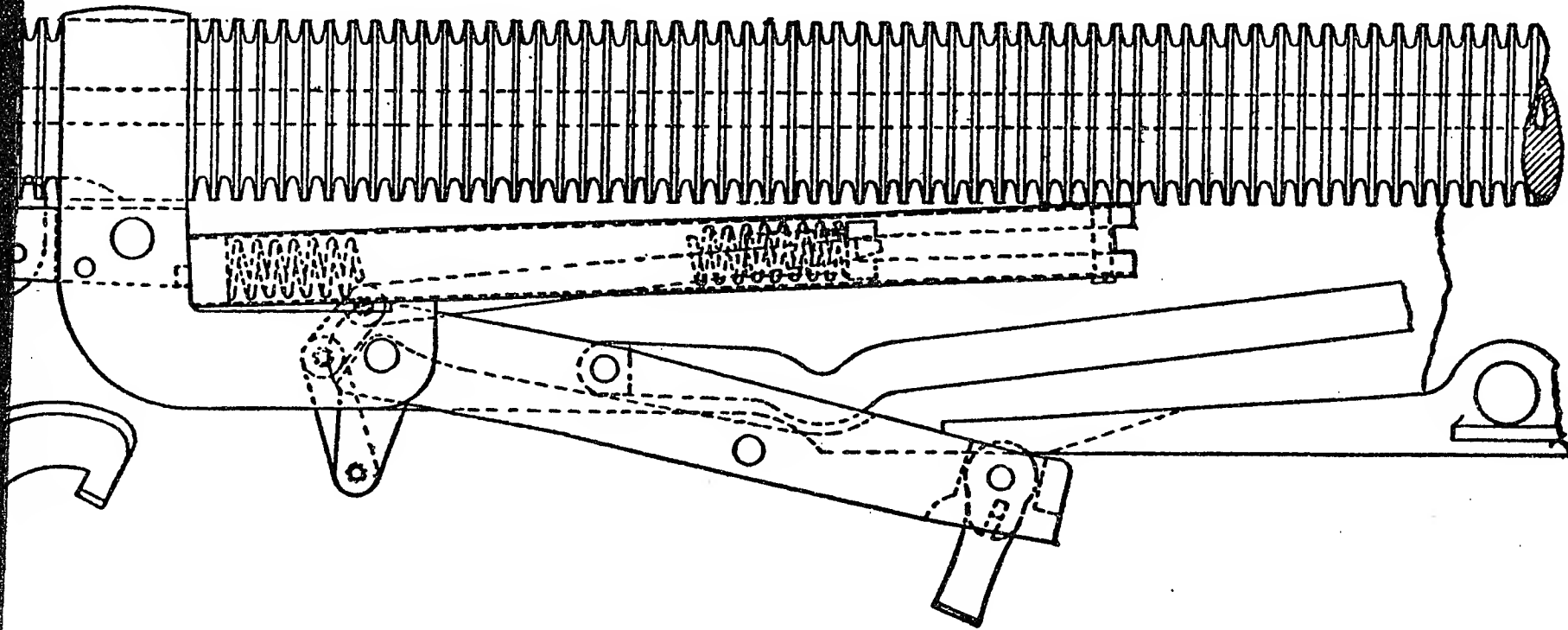
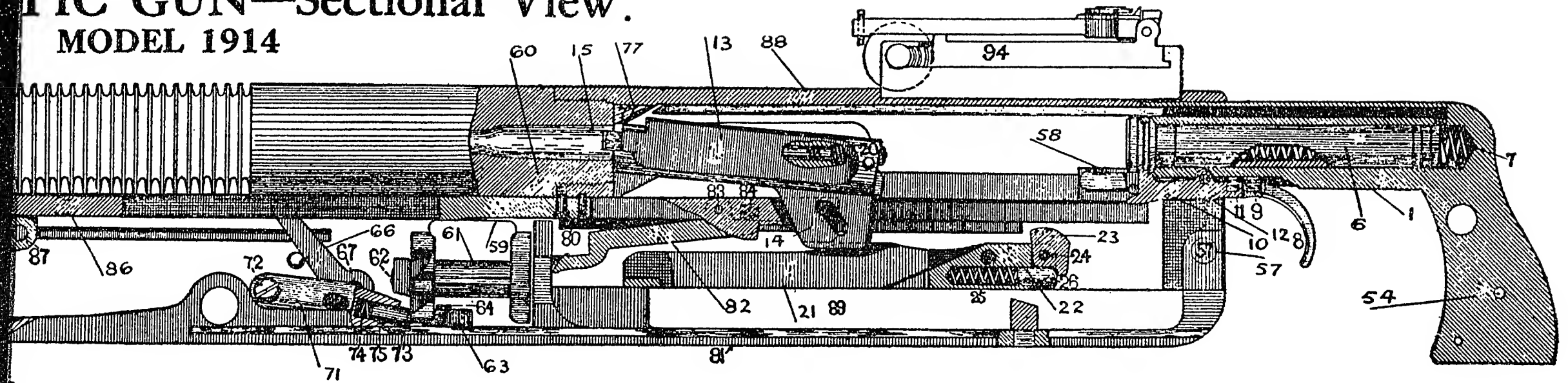
(Shown on plate opposite page —.

This technical drawing shows a mechanical assembly. The main part is a horizontal shaft with a worm gear on the right. A lever is attached to the worm gear. A curved arm is attached to the lever. A circular component is shown on the left. The drawing includes various labels: 'A' and 'B' are points on the shaft; 'C' is a point on the curved arm; 'D' is a point on the lever; 'E' is a point on the circular component. The drawing is a black and white line drawing with dashed lines indicating hidden parts.

A schematic diagram of a piston and crank mechanism. The piston is shown at the top, with a central pin and a cross-hatched area representing the combustion chamber. The crank is shown below the piston, with a central pin and a cross-hatched area representing the crankshaft. The piston and crank are connected by a connecting rod.

TIC GUN—Sectional View.

MODEL 1914



the Gas Lever is thrown downwards and rearwards by the gases coming through the Vent, it forces the Slide rearwards, which performs part of the functions of the mechanism and the Gas Lever being thrown forward again by means of the Retracting Springs performs the other part.

MECHANISM

✓ **The Left Side Plate.**—Beginning at the forward end we find a cutaway portion which fits against the Gas Bracket. The hole underneath this is for the Front Side Plate Screw. The countersunk hole is a seating for the Gas Bracket Pin. Going back, there is a Stud to keep the Retracting Springs in position. The Groove down the centre is called a Guideway, and in this the Slide Pin operates. Underneath this is the Gun Pin Hole under which is the long groove for the Tongue of the Bottom Plate. The raised piece of metal in the centre of the Plate is called the Bullet Guide. Its function is to guide the cartridges into the Feed Wheel. The cutaway portion is to allow the entrance of the Cartridge Belt to the Feed Wheel.

✓ **The Right Side Plate.**—Is similar to the Left Side Plate in so far as the Side Plate Screw holes, the countersunk holes, the Retracting Spring Studs, Dowls, Guideways, Grooves and Gun Pin Holes are concerned. Attached to this Plate is the Ratchet Lever which is operated by the Feed Lever, which in turn is operated by Studs on the Slide. The function of the Ratchet Lever, through the medium of the Pawl, is to operate the Feed Wheel. This may be demonstrated by attaching the Left Side Plate to the Bottom Plate and then operating the Feed Lever by hand. The oblong hole next to the Ratchet is to allow the egress of the Empty

Belt. Below this there is a flat piece of metal termed the Feed Throw-Off, the function of which is to disengage the Pawl and Feed Wheel Dog from the Feed Wheel simultaneously, and is operated by the Knurled Screw-head from the outside. The cutaway portions in rear of this are to allow the ejection of the cartridges, and the oiling, and observation of some of the working parts when the Gun is set up. Forward of the Dowl there is a small hole to allow insertion of the Shank of the Handle Lock to push the Bolt Pin out. Above this is a countersunk groove to allow the free working of the Safety Catch. The small cutaway portion in rear is cut to allow the Handle-lock access to the Receiver.

Bottom Plate.—The forward end is cut away to allow the free swing of the Gas Lever in action. In rear of this is the Gun Pin Hole with notch cut out on top to allow passage of the Gas Lever Connection. In rear of this is the cutaway portion to allow for the free working of the Ratchet. The Feed Wheel is mounted on two Bushings. The Axle consists of one long screw inserted through the Forward Bushing. The raised portion on the Rear Bushing is called the Cartridge Stop, its function is to keep the cartridge in position when on the Feed Wheel. Protruding to the rear is a triangular shaped stud termed the Cartridge Extractor Guide. The Extractor when coming in contact with this is lowered to enable it to get underneath the Rim of the cartridge. The two raised portions in rear of the Feed Wheel act as a rest and a guide to the Cartridge Carrier. The raised portion in the extreme rear is cut away on top to allow for the Trigger Action and the hole passing through is for the insertion of the Rear Plate Screw.

— **The Handle.**—Consists of a Trigger, Sear, Trigger Spring and Sear Spring, Trigger and Sear Pin, Hammer and Main Spring. The countersunk hole in the side is for the insertion of the Handle-lock. The small hole above the Hammer acts as an Air Hole. Through this the jet of air is forced into the Barrel, every time the Hammer goes back. This Air Hole is connected with the Barrel by means of a Brass Tube passing along the Roof of the Receiver. The Hammer cannot be released by pulling the Trigger unless the Sear is disengaged and vice versa.

The Bolt.—Consists of the Firing Pin, Firing Pin Spring and Firing Pin Pin, the Shell Extractor, the Extractor Spring and Extractor Pin. The curved hole underneath is the means by which the Bolt Pin attaches the Bolt to the Slide. The face of the Bolt is cut away to allow the Ejector to perform its function. The raised portion in rear acts as a Buffer to the Hammer. When firing the recoil of the cartridge on the Bolt is taken up by two Resistance Shoulders attached to the Receiver, which Shoulders, the Bolt automatically drops against, when the Breech is closed and ready for firing. It will thus be understood that in order that the Firing Pin may have a steady drive, the groove through the Bolt cut for its reception is cut at an angle.

The Cartridge Carrier.—Consists of the Carrier Dog, Carrier Dog Spring, Plunger and Carrier Dog Pin. The function of this part is to lift up the cartridge to allow the face of the Bolt to engage the base of the cartridge and drive it forward into the Chamber. It is operated by the cutaway portion on the Slide just above the Bolt Pin Hole.

The Trip.—Fitting into the left side of the Receiver, is the Trip, the Forward Stud of which

engages the small groove on the left of the Slide; the Rear Stud engaging in the Nose of the Sear and bearing down on it, releases its grip on the Hammer.

The Safety Catch.—Is shaped so that when operated it proves an obstruction to the Hammer flying forward.

The Belt Guide.—Is attached to the Receiver by means of the Belt Guide Screw and is locked by the Belt Guide Lock Screw, it also is steadied by a Stud; it is situated between the arms of the Slide. It acts as a buffer to the Slide and prevents the Belt dropping in between the arms of the Slide.

The Slide.—On the forward end, are the holes by which it is attached to the Gas Lever Connection, by means of the Slide Pin. On the right side are the two Studs which operate the Feed Lever. At the rear end underneath are the Cartridge Extractors which extract the Cartridges from the Belt. The main Extractor is operated by a small Spiral Spring, and is attached to the Slide by the Cartridge Extractor Pin. The groove on top on the left arm of the Slide operates the Trip. The hole in the rear is for the Bolt Pin. The Gas Lever is operated at one end by the Gas Piston, and is connected (by means of short and long Link and Retracting Connection) to the Retracting Springs, it also operates the Gas Lever Connection.

The Gas Piston.—Fits into the Gas Cylinder; it is through the medium of this part that the whole of the working parts of the Gun are operated.

The Gas Lever Pin.—Is the means by which the Gas Lever can be operated by hand.

The Gas Lever Connection.—Is riveted to the Gas Lever at one end, the other end is attached to and operates the Slide. The Large Link is riveted to the Gas Lever, the smaller one being riveted to the Large Link and the Retracting Connection is riveted to the Small Link. This connection, actuated by the Spiral Springs, operates all the working parts affected during the forward movement of the Gas Lever.

The Retracting Springs.—Are contained in two Steel Tubes and are attached at the forward end by means of Studs to the Gas Bracket, at the other end these Tubes are cut away and Followers are placed on the Springs to allow for the insertion and operation of the Retracting Connection. The Followers and Springs are contained in the Tubes by means of the Retracting Spring Screws.

* **The Gas Bracket.**—Is a heavy piece of metal attached to the Barrel by means of a Band. There are three holes bored through it, the largest hole admits the Front Side Plate Screw, the smaller one admitting the Gas Bracket Pin and connects the Gas Lever to the Gas Bracket. The smallest hole admits the Gas Cylinder Pin and is the means by which the Long Arm of the Gas Cylinder is attached to the Gas Bracket.

* **The Gas Cylinder.**—Is attached to the Barrel by means of a Band. Directly under this Band is the Gas Cylinder proper which admits the Gas Piston and forms the connection between the Gas Vent and the Gas Piston. Attached to the Long Arm by means of a rivet is the Barrel Lock which operates in a Slot cut in the Arm and actuates on a Slot cut for its reception in the Barrel, its function is to keep the Barrel from any slight rotation.

RATE OF FIRE

is affected by:

1. Time consumed by bullet in its course from the "Lead" (position of bullet when cartridge is in Chamber) to Gas Vent.

2. Pressure through the Gas Vent, governed by the Powder charge.

3. Size of the Gas Vent, which regulates the amount of force taken from the explosion.

4. Weight of moving parts; a small alteration in the weight of the Gas Lever will affect the rate of fire.

5. Length of the Connecting Rods and Levers.

6. The strength of the Retracting Springs.

7. The condition of the Belts.

8. Ammunition.

9. By changing the point of firing; by changing the location of the Cut which operates the Trip. The Gun fires (as at present made) when the top of the Gas Piston is about half an inch from the mouth of Gas Cylinder, if fired when fully closed the rate would be correspondingly increased, as more pressure would be utilized. As the distance between Cylinder and Piston increases at firing point, so the rate of fire decreases.

10. By flattening the Lower Side of the Trip Pin, the rate of fire will be slightly increased as this allows the Piston to decrease the distance from the Cylinder at the firing point, owing to delay in Trip Pin to operate the Sear.

11. Leakage (caused by wear) between Gas Cylinder and Barrel.

12. Leakage around Gas Piston (caused by wear).

SOME HINTS ON STRIPPING

When Stripping it will be found easier to leave the Barrel on the Gun.

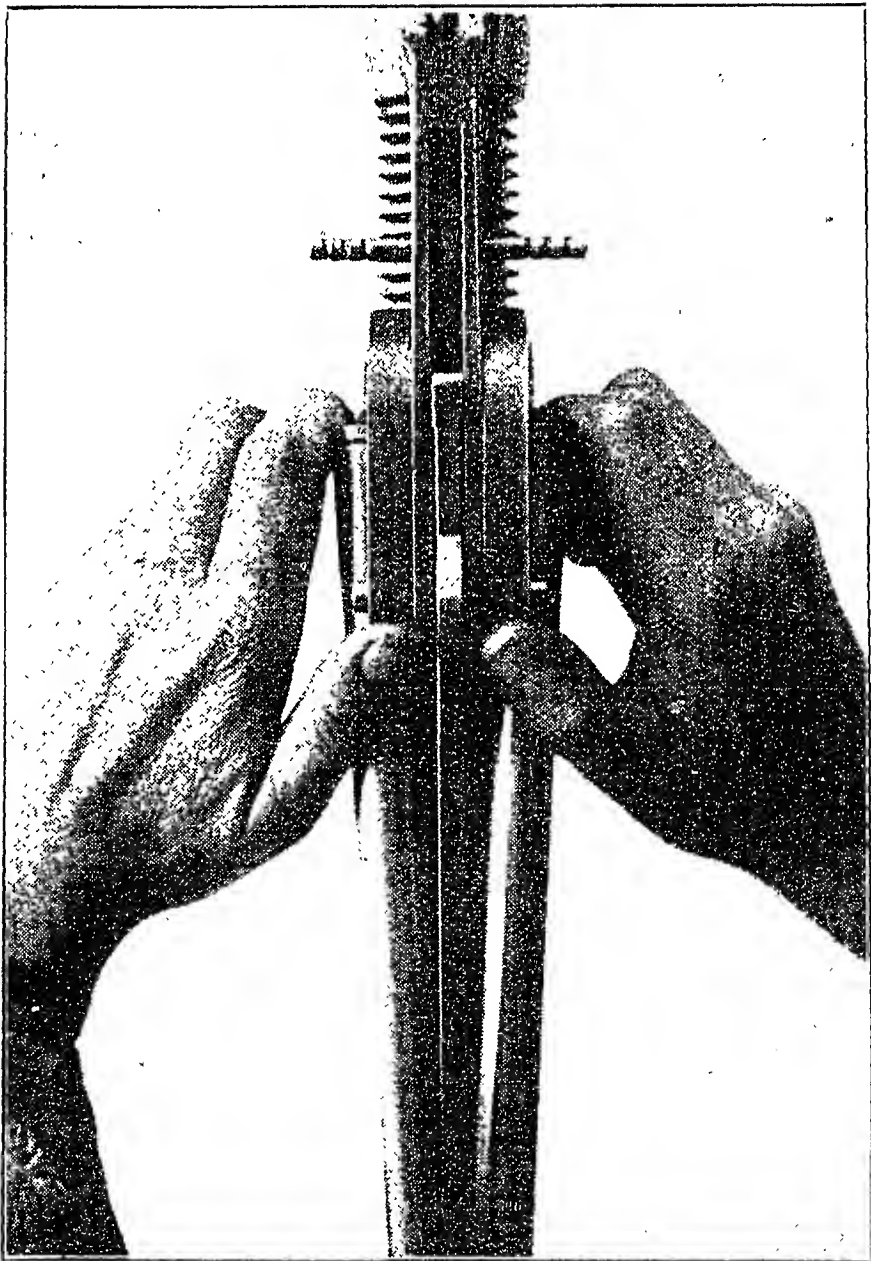
1. Lay the Gun on its right side and place two pieces of wood under the Gun to keep it steady and to prevent it rocking on the Gas Lever Pin and Sight Adjusting Thimble.

2. **Side Plate Screws.**—To unscrew, use Combination Wrench, not small Screw Driver, which may be inserted in hole in Combination Wrench if Screw is stiff.

3. **To Remove Handle.**—Withdraw Handle-lock and standing on the right side of the Gun, turn to the left and thus face it, seizing the elbow on top of the Stock so that it rests in the palm of your left hand, strike your left hand smartly with the palm of the right hand and withdraw Handle.

4. **To Remove Bolt.**—First remove Handle, then standing on the left side of Gun facing it, with the left hand draw back the Gas Lever until it reaches the Bottom Plate, then leaning against the hole on the Left Side Plate, insert the Handle-lock in the small hole in the rear end of the Right Side Plate, pressing it in as far as it will go. By so doing the Bolt Pin is freed from the Bolt, and attaches the Slide to the Receiver, and so prevents the Gas Lever going forward. Now elevate Gun by the Hand Wheel and the Bolt drops out.

5. **The Retracting Springs.**—Should be removed by inserting the thumbs between Connection and Tubes with downward pressure applied. To replace them, first see that Retracting Connection



Placing the two forefingers on the right and left side of the Studs of the Retracting Springs, with the thumbs on either side of the Gas Bracket; by exerting pressure backwards with the forefingers the Studs in the forward end of the Tubes may be inserted in the recesses made for their reception in the Gas Bracket.

is inserted into Followers as far as it will go, keeping the heads of the Follower Screws away from the Barrel, then turn half right, carry the left hand over the Barrel, placing the two fore fingers on the right and left of the Studs of the Retracting Springs with the thumbs on either side on the rear portion of the Gas Bracket, by exerting pressure backwards with forefingers the Studs in forward end of Tubes may be inserted in the recesses made for their reception in Gas Lever Bracket.

6. To Replace Bolt.—Elevate Gun until horizontal, insert the Bolt and checking the Gas Lever, press in Bolt Pin as far as it will go. Then release the Gas Lever.

7. To Remove Barrel.—Pin back Lever as above, disconnect Barrel Lock from Barrel, then standing on the right side, place Combination Wrench in recess made for it underneath, and about 6 inches from Muzzle, holding the Wrench with the left hand, strike it smartly with the right hand, unscrew the Barrel and remove.

8. To Replace Barrel.—Reverse the above motions, standing on the left side of the Barrel, and glancing over the Right Shoulder at the two chisel marks, where Barrel joins the Receiver, when flush, remove the Wrench, replace the Barrel, lock and release the Gas Lever.

9. If the Bolt is inserted and the Bolt Pin put through, when the Gas Lever is in its forward position, the Bolt does not connect with the Slide which is denoted by the Gas Lever stopping when only three-quarters of the way through its swing.

10. Be careful that the Feed Lever is between the two Studs on the right hand side of the Slide.



Note:—The attention riveted on the chisel cuts. The body leaning on the barrel to support the Gun against the jar of the blow about to be struck with the right hand.

11. If, when all holes coincide with each other, there is difficulty experienced in getting the Gas Bracket Pin to fit into the recesses made in the Slide Plates for it, tap the Gas Bracket either backwards or forwards as required with a piece of wood, until they engage.

For full particulars see Colt Hand Book.

METHODS OF FIRE

1. **Before Firing See**—That the Tripod is well settled in the ground.

2. That your Belts are correctly loaded, 1/16 to 1/8 of an inch of the Cartridge Case showing on bullet side of Belt, see also that they are laid correctly in the Boxes.

3. That the Barrel is cleaned of all oil, and that the Gas Vent is clear.

4. That the mechanism is thoroughly oiled, special attention being paid to the Gas Piston, Retracting Springs, Ratchet Lever, Slide, Bolt and Hammer.

5. That the Spare Parts Wallet is on the Gun, and all Spare Parts together with ½ pint oil can, Monkey Wrench, Pliers, Combination Wrenches are at hand.

6. That the Gas Lever works freely, and does not appear to be rubbing anywhere (a slight check will be felt on the Lever as the Extractor takes the cartridges out of the Belt—this is unavoidable).

DURING FIRING, SEE

1. That the Belt runs freely into the Gun and is not checked.

2. That during a temporary pause any partially filled Belts, including the Belt at the Gun are replaced by full ones, and the partially filled ones are taken to be refilled.

3. When possible, if rapid fire has been employed, change the Barrel every 500 rounds, if hot, but in any case a Barrel should not be used for more than 750 rounds as a very hot Barrel gives inaccurate fire.

4. That the Clamps have not loosened by the vibration of the firing, and so moved to the aim of the Gun.

5. That the Gun never lacks an ample supply of ammunition.

AFTER FIRING, SEE

1. That the Gun is temporarily cleaned immediately the last shot is fired, and subsequently cleaned, as described under **Fouling**.

2. That the Gun is properly unloaded; any pressure exerted on the Belt by No. 2 before No. 1 has entirely freed the Feed Wheel, by pressing the Feed Cut-off forward, is useless and causes loss of time.

3. No. 1 must tighten the Clamps, and be very careful to see that the Snaps of the Wallet are done up before moving.

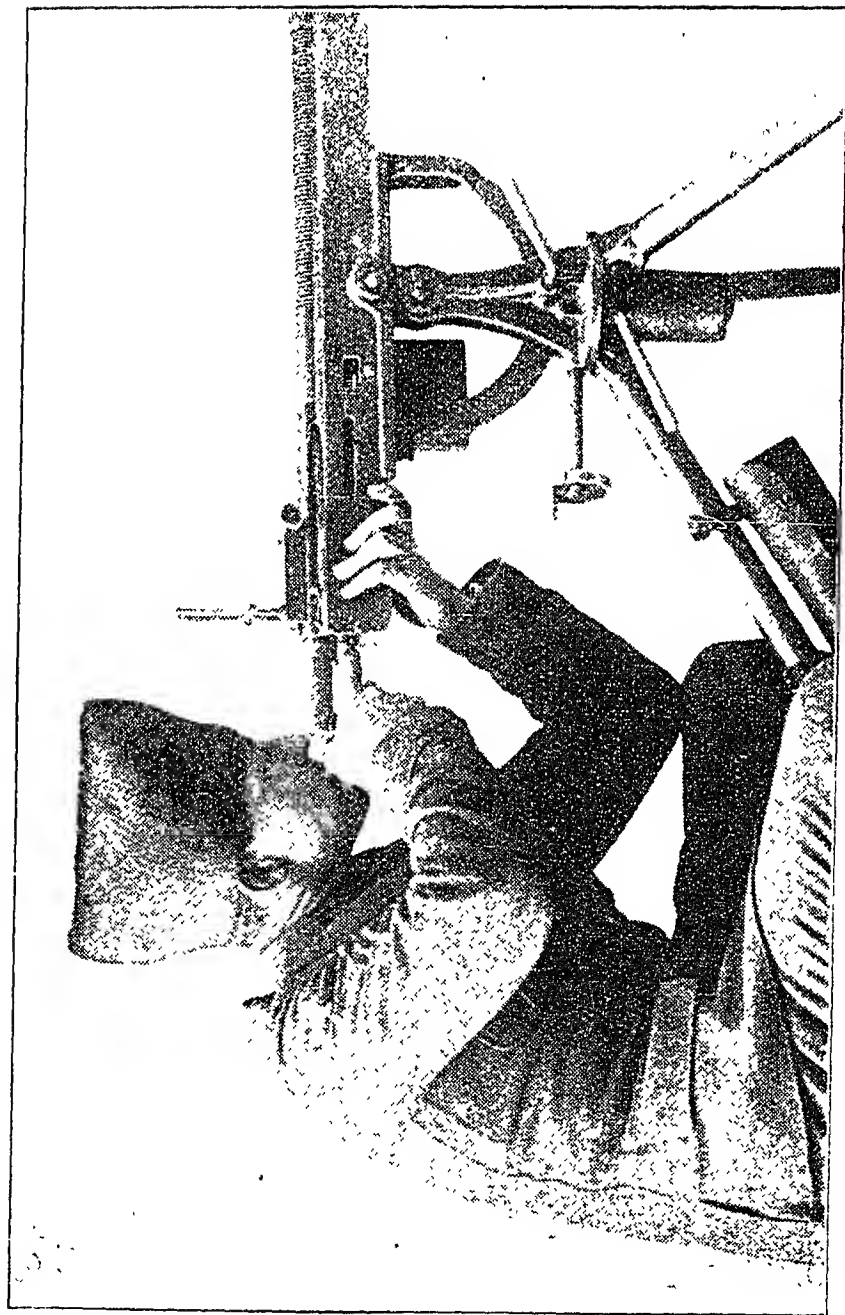
4. Remove all live cartridges from amongst empty cases. The British forces were sometimes

traced in South Africa by their carelessness in leaving live rounds about. Conservation of ammunition is a Machine Gunner's special care.

5. Try to keep a History Sheet of each of your Guns Encourage your Nos. 1 to do this.

Grouping Fire.—Is firing a group (from 5 to 30 rounds) so that all the shots will strike within a small area, this area will of course increase as the range increases. The position of the Firer should be so that he has a good "Hold" on the Gun and to acquire a good hold requires a lot of practice: First aim your gun, then clamp both Clamps tight, with the right hand on the Trigger, and the left hand holding the Gun underneath the Sight Bed, thumb on the left Side Plate, fingers on the Right Side Plate, the left elbow resting on the left knee, the hand, elbow, knee and foot should be in line, lower the head, resting the right cheek bone on the right thumb, close the left eye and align the Sights on the mark, now exert an upward pressure with the left hand by slightly drawing in the Left Leg, at the same time exert a downward pressure with the right hand and press the Trigger.

Single Shots.—Used for sniping purposes by the Germans. First, lay your aim, aiming slightly higher than you wish your aim to be when set, then clamp your Elevating Clamp tight, it will then be noticed that the action of the Clamp slightly depresses the aim, causing it to come to its correct position, i.e. at 6 o'clock under the object aimed at. Next aim slightly to the right of the object, and Clamp your Traversing Clamp tight; it will then be noticed that the action of this Clamp has a tendency to slightly move the Gun to the left, and by aiming to the right, before putting on the Clamp, this is overcome. Now assume a comfortable position, and press the Trig-



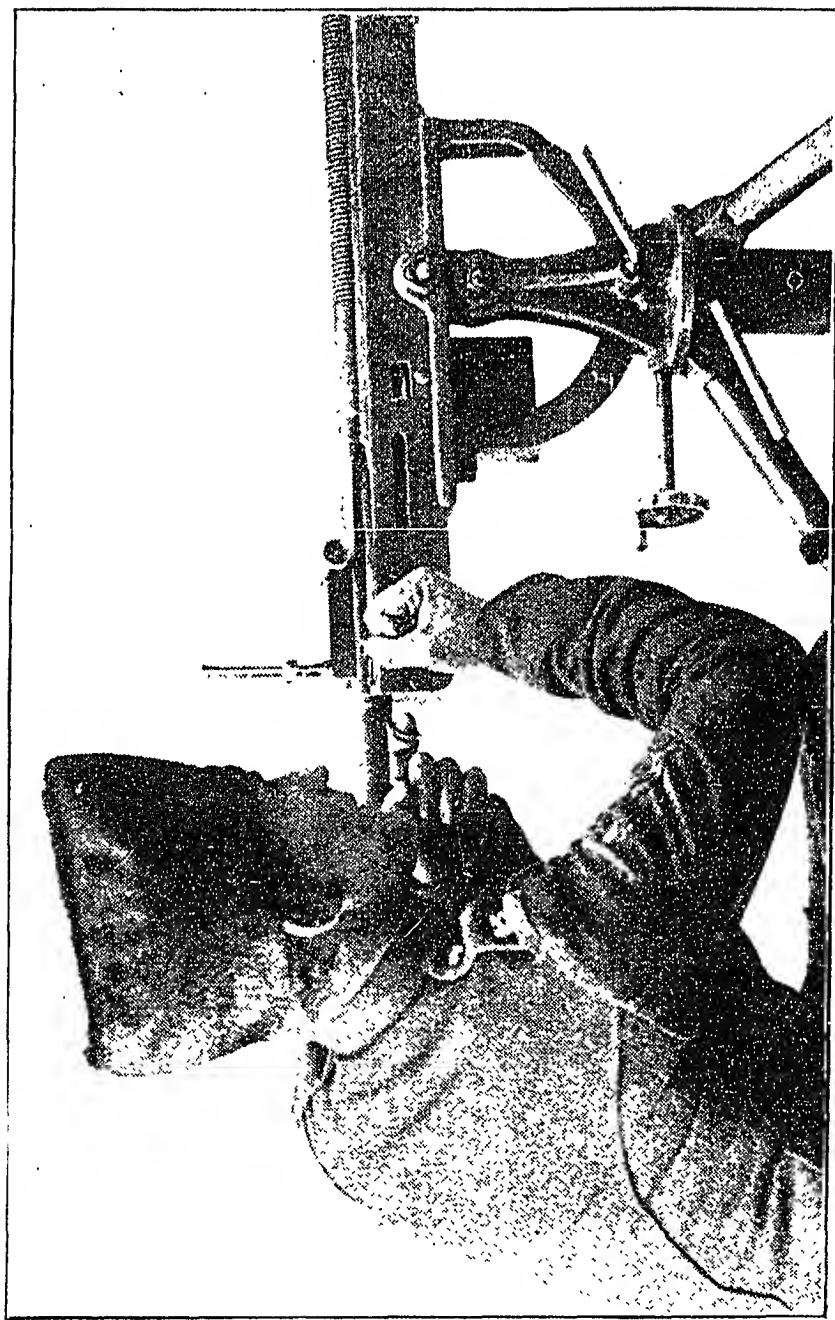
Grouping:—Note the support and upward pressure derived from the left knee. The downward pressure on the handle exerted by the right hand.

ger without exerting any pressure on the Gun. It will be found that about 25 rounds per minute can be fired in this manner, without the aim of the Gun being in any way disturbed. In the same way by exerting pressure on the Handle of the Gun, an experienced Gunner, can put one shot in each corner of the target and one in the bull's eye.

Traversing Fire.—This method is used against a linear target, and is applied as follows: First lay your aim, then making Elevating Clamps tight, then test the lay of the Gun by Traversing it from the right to the left limit of your target, then come back to the right limit, and set Traversing Clamp so tight that a good blow on the Side Plate will just move it. Then, having assumed the position for Grouping Fire, remove the left elbow from the knee and apply a side pressure from right to left with both hands and fire a shot; it will then be noticed that the Gun has moved over slightly to the right, repeat the process and it occurs again, and so on, and if continuous pressure is kept up on the Trigger the same result is obtained. Traversing is the principal method of fire used by the Machine Gunners, and frequent practice is necessary before proficiency is obtained. Traversing Fire as laid down is taught by the Gunners holding the Handle and Trigger with the left hand, and then tapping over with the right hand which is done by resting the right elbow on the right knee and closing the fist, knuckles to the front, then strike the Right Side Plate which causes the Gun to "jerk" over, so that at 30 yards, on the Instructional Target the bullet holes can be evenly spaced 2 inches apart. The above method causes the Gun to traverse from left to right. To traverse from right to left reverse the above, holding with the right, and "Tapping" with the left hand.



Traversing Left to Right:—Note the pressure from Right to Left exerted by the firer. The left arm, unsupported, exerting the side pressure, also the right hand. The left knee tight up against the tripod. The right leg acting as a support and brace.



Tapping Practice:—Traversing Left to Right. Eyes away from Sights. The whole attention devoted to the "tapping." Right elbow on right knee to ensure steadiness.

Diagonal Traversing.—Used against any angular linear target. This is the most difficult form of fire, the side pressure has to be applied with the particular hand that holds the Handle, the other hand working the Elevating Wheel. When the "Tapping" method is being used the hand which is on the Elevating Wheel has to be withdrawn and utilized to "tap" over the Gun, though an experienced Gunner may be able to obtain both elevation and direction without touching the Elevating Wheel.

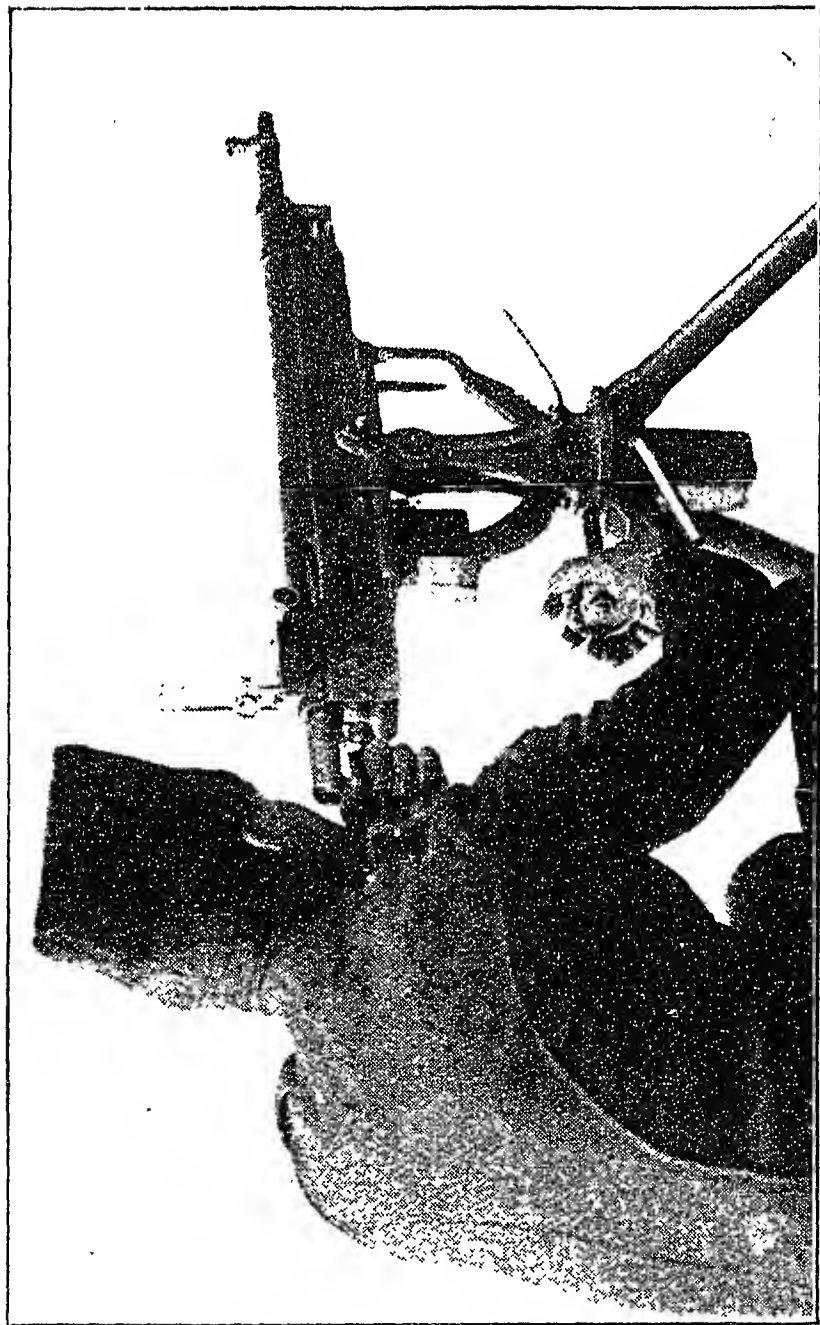
Vertical Searching.—The object of this fire is to fire vertically, and it is the easiest form of Machine Gun firing. It will be found that the best results are obtained by operating the Elevating Wheel with the right hand and firing with the left, the reason being,—that the right hand has more control over the correct spacing with the Wheel, than the left; the right hand should grasp the Wheel as in Diagonal Traversing, right elbow resting on right knee grasping the Hand Wheel with the palm facing firer, Shank of Hand Wheel between first and second fingers. It will be noticed that by keeping a regular pressure on the Wheel and a downward pressure on the Handle that the Gun will elevate itself when fired; all that is necessary is to pick up the play or slack with the Wheel.

Position of Clamps for Single Shot and Grouping.
—Both Clamps rigid.

Traversing.—Elevating Clamp rigid; Traversing Clamp "sticky," and moderately on.

Diagonal Traversing.—Both Clamps "sticky."

Vertical Searching.—Traversing Clamp rigid. Elevating Clamp "sticky."



Vertical Searching:—Note the steady grip on the Elevating Wheel with the right hand. The right elbow on right knee. Trigger in left hand.

Three Fire Orders.—As taught at Instructional Target, and three applicable to the field; these orders may be given disjointedly so that the Nos. 1 may have no difficulty in repeating them:

1. **Single Shot Traversing Fire** left to right at 800 commencing at the second figure from the left hand Band. **Load. Fire.** (2) **Grouping Practice** 6 rounds rapid at the fourth figure from the right of the right hand Band at 800. **Load. Fire.** (3) groups of 5. **Diagonal Traversing** at 800, commencing at the left hand figure of the centre Band. (4) **At the Enemy** half right, at 1200, ranging fire; commence. (5) **At the Enemy** in front; traversing left to right, at 500, rapid fire; commences. (6) **At the Enemy**, half left, combined sights at 1200; commence. Fire orders should always be as brief as possible in conjunction with a thorough understanding of the order. When a Range Card is being used, or, on any occasion when a landscape target presents itself, the "Clock Face" method may be used, to locate an indistinct object, and orders may be given thus: "**Church** (or object No. 3), 4 fingers right, at 4 o'clock, **Stable**. At 6 o'clock from stable. **Wooden fence**. At ground line of wooden fence. At 900, **Traversing fire**, left to right, commence." Machine Gunners should never open fire except against a favorable target, or, when the tactical situation demands it. In covering fire, **Traversing, Rapid**, will usually apply.

Traversing Fire may be given in any volume, either single shot, or in groups of 5 to 10 rounds or continuous, according to the density and distance of the target offered by the enemy.

Rapid or Continuous Fire should rarely be continued for more than 30 rounds as by that time the vibration caused will have materially affected the

sighting and will mean waste of ammunition in any case; as objectives are strack several times when once would suffice, of course at very close ranges this does not apply. Rapid fire is usually used against a very favorable target and to effect surprise.

Ranging Fire is never used when surprise effect is required, but otherwise can be employed to pick up a range, done by firing a group of from 5 to 10 rounds according to nature of soil, if this is dry or sandy, often a single shot will do.

Combined Sights may be usefully employed when range is unknown, or the target very deep, the range given is always the lowest range. No. 4 Section sets his Sights at the given range, Nos. 3, 2 and 1 Sections each elevate their Sights the required distance, either 50 or 100 yards higher than the section on their left, thus if the order is given: **Combined Sights, 1200**, the Sights are as follows: No. 4 gun 1200, No. 3 1250, No. 2 1300, No. 1 1350. For ranges under 1200 yards the difference in elevation between Guns should be 100 yards and when over 1200, 50 yards only.

Vertical Searching may be used to distribute fire in depth, such as Enflading a trench, or when desiring to search a deep area of ground; this is fully described on Page 242, Table C. Musketry Regs. Part I.

Indirect Fire.—Utilized at long ranges; the Guns are placed behind cover of a hill or rising ground, two stakes are now placed in the ground so that they are in line with the enemy's position or the object to be fired upon. A portion of both these stakes should be visible from the Gun position in rear of the hill. The Sights of the Gun are now aligned with the two stakes, the angle of tangent

elevation is now adjusted on the gun (by means of an instrument called a Glynometer) to the range; for instance, fixing the mark VII, ammunition at 2,000 yards, the angle required is $4^{\circ} 24'$. The probable minute corrections necessary will be signalled from the observation post. It is of course necessary to see that the line of departure of the bullet (slightly higher than that of the Axis of the Barrel), clears the summit of the hill which is being used as cover. (See Chap. VII.)

Intermittent Firing.—Effected by an irregular and intermittent pressure on the Trigger, is used to endeavor to deceive the enemy from recognizing the automatic noise of Machine Gun Firing. By this means it is endeavored to represent the noise of a number of rifles.

FOULING

There are three kinds of Fouling to be contended with, Internal, Metallic and Superficial.

Internal Fouling.—This is caused by the forcing of gas or harmful material into the pores of the metal and occurs to a modified extent every time the Gun is fired, to remove, take off Barrel and plug up Gas Vent Hole, then, holding the Barrel with the Asbestos Mitts, having inserted a small funnel in the Cartridge Chamber, pour about 1 gallon of boiling water with a pinch of washing soda in it through the Barrel, then thoroughly dry and oil. The above method of cleaning should be always used when possible, and after every day's practice on the range.

Metallic Fouling.—Is caused by a portion of the nickel of the Envelope being scratched or rubbed off by the Lands of the Rifling and can be plainly

seen if near the Muzzle by the appearance of a Whitish streak on the Land or Lands (Lands are raised portions between the Grooves of the Rifling the Bore of the Barrel); this causes inaccuracy in the flight of the bullet, and gets worse if neglected.

To remove: First treat for Internal Fouling, then when Barrel is thoroughly dry, having plugged up the Gas Vent Hole, pour in the following solution: $\frac{3}{4}$ oz. ammonia (0.88 Sp. Gr.), add " $\frac{3}{4}$ oz. water, 30 grains ammonia persulphate, and 10 grains ammonium nitrate," allow to soak in Barrel for about 25 minutes then remove, when it will be seen, the solution will have turned a blueish color, then wash dry and oil the Barrel. The above solution has no injurious effect upon the Barrel and should be used about once a month, when the Gun is in frequent use, whether Metallic Fouling can be observed or not. The mixture does not keep, and enough only to do the two Barrels should be obtained at a time.

Superficial Fouling.—This is caused by the deposit in the Bore, of the solid products of the combustion of the charge and cap composition, and might be termed the "temporary fouling" which should be attended to at all times during firing, it can easily be removed while Barrel is hot by use of a phosphate bronze brush attached to the Cleaning Rod, or the use of Pull Through and flannelette. Tear the 2 by 4 flannelette in half, making 2 by 2 for use with the Cleaning Rod, but if possible use a phosphate bronze brush.

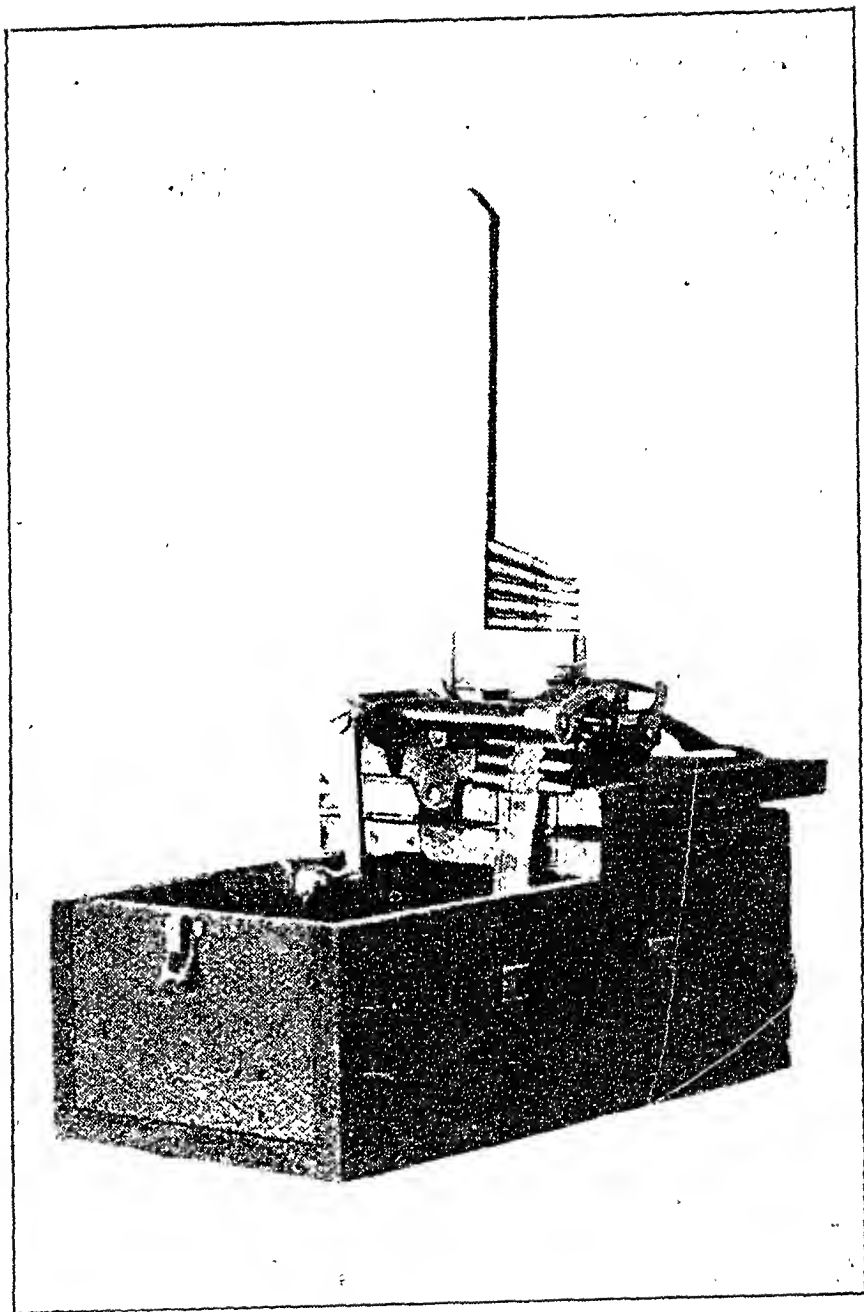
The Bolt Head must always be carefully cleaned, and scraped, as fouling through the heat and leakage round Cap always accumulates and if neglected actually eats clean through the Bolt Face and ruins it.

Gas Vent.—This is an all important point to be attended to; a badly fouled Gas Vent will alter the rate of fire, as it is partially the actual size of this hole that regulates the rate of fire, and if fouled, being consequently made smaller by the fouling, it will cause the rate of fire to be reduced, to clear this Vent, secure 3 Reamers .0080, .0083, .0086 and use these, as found necessary.

The Gas Cylinder.—Between the Gas Cylinder and the Barrel there is bound to be some slight leakage of Gas and this is always noticeable to a greater or less extent round the Gas Vent. This fouling eats away the metal and if not attended to eventually will cause such a leakage that automatic firing would cease owing to the main part of the explosion escaping between the Barrel and the Gas Cylinder; keep Barrel scraped and cleaned, and when possible use "oil drag" round these parts, any lubricant which has graphite in its composition will be found suitable.

THE COLT BELT LOADING MACHINE

This machine may be attached to any table or bench, but, as in the field these appurtenances would be next to impossible to procure; it is always advisable to load the Belt in the rear of the Gun whether being used on the ranges or in any other place. Under the above circumstances it may be secured either to an Ammunition Box or the box in which the Machine is kept, but it is far better to have a box made out of some hard wood and constructed as follows: Dimensions of box, 18 in. by 10 in. The lid should be divided into two sections, the small section which is nailed solidly to the box is 6½ inches long, the hinged half, to which the



Belt Loading Machine Box:—Note the cut-away portion on the left side; to allow free working of the handle. The cut-away portion in the hinged lid to allow for the fitting of the frame. The recess underneath the fixed lid may be used for tools, spare belts, oil cans, etc.

Belt Loading Machine is attached, is $11\frac{1}{2}$ inches long. The Belt Loading Machine is attached to the latter half by means of two screws. This half when lowered in position, leaves the Handle of the Machine right in the centre so that when the box is closed the mechanism of the Machine is not liable to become dusty, or in any way interfered with. In the bottom right hand corner of the box there are two pieces of wood placed in such a position that the Cartridge Guide will be held immovable by means of a Button.

The Mechanism of Machine.—The frame is a solid piece of metal with two Tips projecting on each side for the purpose of fastening the Machine into position. Attached to this frame are the following parts: Starting from the left side, there is the Needle Bar Lever Pin. On this Pin works the Needle Bar Lever, attached to this by means of a screw is the Needle Bar Lever Spring. The function of this Lever works the Needle Bars. To the right of this is the Carrier Pin to which is attached the Carrier. To the left of this is the Carrier Spring Pin to which is attached the Carrier Spring. Its function is to push the Cartridges from the Guide into position in front of the Slide. To the right and left of the Carrier are the Carrier Stop Pins (2). To the right of the Carrier is the Slide which is attached to the Crank Shaft by means of the Slide Connection, and Slide Connection Pin. Its function is to drive the Cartridge home into the Belt. The Crank Shaft is set into a Frame Cup to which is attached the Crank Handle by means of a screw. Working on the Crank Shaft is the Feed Lever which is held in position by a Feed Lever Spring and Feed Lever Spring Screw. Its function is to operate the Lower Feed Wheel. Attached to the right side of the Frame is an Arm to which is attached the Upper

Feed Wheel Arm and attached to the latter by means of a screw is the Upper Feed Wheel. Attached to this Arm is the Tension Spring. This Spring is held in place by a Tension Spring Hook which is attached to the Frame by means of a screw. The Lower Feed Wheel is attached to the Right Front of the Frame by means of a screw, and is operated by the Feed Lever which is kept in position by a Lower Feed Wheel Spring which is attached underneath by means of a screw.

Needle Bars.—The Needle Bars are two pieces of metal about 2 inches long and are held in position by two screws, to the Needle Bar Slide. There are two grooves cut in the Bars for the insertion of the Needles. The rear end are Bull Nose shape. The front end of the Upper Bar is cut with a downward slope. The cutaway portion in the rear of the Front End is for the entrance of the nose of the bullet when entering the Belt. Its functions are; when the Belt is placed in the Machine the action of the Needle Bar Lever forces the Needle into the Belt. and as the Needle Bar Lever returns to its original position, it draws the Needles out of the Belt. The Belt Guide is a flat piece of metal which is attached to the Frame by means of two Belt Guide Screws, and Belt Guide Dowl Pins. Attached to the Belt Guide is a Belt Guide Cover by means of a Belt Guide Cover Screw. There is a Slot cut in the Belt Guide Cover, which makes it into a Spring, the function of this is to keep a certain tension on the Belt.

The Magazine.—Is a piece of brass which is made to cover the main working parts of the Machine. It is held to the Frame by means of two Magazine Dowl Pins and two Magazine Screws.

Cartridge Guide.—The Cartridge Guide is a hollow piece of metal 11 inches long. At the top end it is cutaway at an angle. At the bottom end is a Cartridge Guide Key by means of which it fits into the Magazine. There is a groove on each side so that the Cartridges will stay in position. The function of this is to guide the Cartridges into the Magazine.

CHAPTER V.

STOPPAGES OR JAMS

Are an uncommon occurrence with the Colt Gun when handled properly. When a Stoppage or a Jam occurs, observe the following rules:

1. If the Gas Lever is up and closed, keep the finger on Trigger and wait, it is probably a hang fire.

2. If the Gas Lever stops during its swing, always work it gently rearwards, never forwards.

3. If the Spare Part Wallet has to be drawn from, always replace the part borrowed in the Wallet as soon as possible so that Spare Parts may be kept complete.

Stoppages or Jams may be said to come under two headings:

1. Avoidable, overcome by a high standard of training.

2. Unavoidable, minimized by thorough knowledge of the Gun, and care to keep Spare Parts Wallet well up to its full complement.

A Jam or Breakage of most of the parts will cause an immediate cessation of fire, and immediate action on the part of the Gunner should locate the trouble at once.

Jams may be caused through:

1. Damaged Cartridge Case.
2. A weak Propellant.
3. A defective, wet, worn, new or badly loaded Belt.
4. Defective working parts of Gun.
5. Improper handling.

1. Many cartridges, especially on active service, where they may get roughly handled, are liable to get dented or bruised; the result is that the Retracting Springs have not the power to force them into the Chamber, but sometimes have force enough to jam them in hard enough to break the Extractor when it endeavors to withdraw them.

Remedy.—Always examine Belts before firing, for damaged cartridges.

2. During the manufacture of billions of rounds of ammunition it is quite possible that one or two ‘batches’ may turn out to be defective, in so much that, the cordite may not have the necessary force to drive the Gas Lever backwards far enough, the result is, single shot, owing to the Hammer not being driven far enough back to become engaged by the Sear.

Remedy.—Enquire if there is any of this doubtful ammunition in the locality and avoid using it. The year when it is made is stamped on the cartridge. The day, month and year is printed on the box. 3. A Belt may cause jams and trouble generally from three causes: (a) Through it being wet, or oily, (b) new, (c) badly loaded:

(a) A wet or oily Belt tightens the grip that it has on the cartridge to such an extent that the Extractor although succeeding in withdrawing the cartridge from the Belt, utilizes more of its share of the force of the explosion (transmitted to it by the Gas Lever), the results is, that the Gas Lever has not force enough to come right back and Cock the Hammer. **Remedy.**—Strip the Belt, and thoroughly dry it, if oily wash and dry. Then treat by soaking it for half an hour in a solution of 1½ lbs. Paraffin Wax to ½ pint Naptha. In case of emergency, ease the cartridges in their seating in the Belt.

(b) **New.**—A new Belt may give similar trouble through the same influence on the cartridges. **Remedy.**—Hand load it first and then ease the cartridges.

(c) **Badly Loaded.**—From 1/16 to 1/8 inches of the Brass Case should be showing on the bullet side of the Belt, if pushed too far in, the Belt has too tight a grip on the cartridge, with result as mentioned above if the cartridge is not far enough into the Belt; the Base of the cartridge is liable to jam in the Aperture in the Side Plate. The Colt Gun being in the first place manufactured for the U. S. A. Rimless Cartridge, the opening where the cartridges feed through on the Left Side Plate hardly conform to the Rimmed Cartridge, and if trouble is occasioned here, a good plan is to cut two small slots to allow for the free passage of the Rim of the cartridge. **Remedy.**—Examine the Belt thoroughly before firing.

4. **Defective Working Parts.**—There are 96 Working Parts to the Colt Gun, most of these if seriously damaged might cause a Jam or Stoppage, a few of the most important may be mentioned;

1. The Handle being loose may cause following up. **Remedy.**—Tighten up Rear Side Plate Screw.
2. The Rim round the forward end of the Hammer may be notched or worn. Result, Following up. **Remedy.**—Put in a new Hammer or, temporarily, the Hammer may be turned partially round, thus presenting a new portion of the circumference of the Face of the Hammer to the Sear and Trigger.
3. **Main Spring Weak; Result.**—Cartridge does not explode and only slight indentation on Cap is visible **Cause.**—Dirt, grit or legitimate wear. **Remedy.**—Stretch it by pulling it with your hands, or by placing two drifts through either end of Spring; to enable you to get a good grip; if still too weak put in new one.
4. **Trigger or Trigger Spring Broken or Worn; Result.**—If firing, automatic firing continues even when Trigger is released, this is easily checked by pressing and holding over Safety Catch, or holding an obstruction in front of the Arms of the Toothed Arc. **Cause.**—Wear. **Remedy.**—Replace new Trigger or Spring.
5. **Sear or Sear Spring Broken or Worn; Result.**—Following up of Hammer and non explosion of cartridge. **Cause.**—Wear. **Remedy.**—Replace new Sear or Sear Spring.
6. **Bolt Face Fouled; Result.**—Blow back through face of Bolt. **Cause.**—Chiefly through leakage of explosion round the cap seating, unavoidable, though, through cleaning and scraping, from the very start of a new Bolt this will be greatly delayed.
7. **Shell Extractor Worn or Broken; Result.**—Exploded Cartridge Case (shell) remains in Chamber. See Section 19.

8. Firing Pin Broken; Result.—Cartridge fails to explode. **Cause.**—Too little oil, accumulated fouling dirt or “snapping” on an empty Chamber. **Remedy.**—New Firing Pin; a serviceable Firing Pin can be made out of a large nail.

9. Carrier Dog Spring, Weak or Broken; Result.—Cartridge not raised far enough to become engaged by face of Bolt and a jam occurs. **Cause.**—Too little oil, defective Spring or dirt. **Remedy.**—Clean thoroughly; the Spring and its recess, stretch Spring or replace with a new one.

10. Gas Lever Piston Pin Broken; Result.—Liable to loose Gas Piston or cause jam by a projecting piece of Pin striking on Arm of Toothed Arc of Mount. **Cause.**—Gas Piston in seizing in Cylinder or Pin seizing in hole in Gas Lever and being of brittle metal. **Remedy.**—Replace new Pin, and to avoid further breakages always remove Pin, clean and oil it thoroughly after firing.

11. Gas Lever.—Through the agency of the Gas Lever (which derives its power and stroke from explosion of the cartridge), the whole of the mechanism is worked. **If Driven Partially Back.**—The new cartridge instead of being lifted up by Carrier is forced forward against Rear Wheel or Bushing of the Feed Wheel. **If Not Driven Entirely Back.**—The new cartridge jams against the Receiver.

See that the Gas Lever Connection does not rub against the side of the Slot in the Bottom Plate.

See that Short Right Angled Arm does not rub against Retracting Spring Tubes.

12. Retracting Springs, Weak, Dirty or Broken: Result.—Gas Lever, if coming back at all, comes back very slowly, causing labored firing. **Cause.**—Faulty Springs, or allowing Springs to get dirty.

Remedy.—Remove Springs, wash inside Tube, and sprinkle with gasoline, then dry and oil thoroughly before replacing. Each Spring should weigh 20 lbs.

13. Gas Vent Clogged or Fouled; Result.—Non-automatic or irregular firing. **Cause.**—Through it not being kept clean. **Remedy.**—Clean with Reamer .0080 to .0086 diameter. Clean at least every 1000 rounds fired.

14. Gas Cylinder Loose; Result.—Slow or non-automatic firing. **Cause.**—Escape of Gas between Barrel and Gas Cylinder. **Remedy.**—Thin Asbestos Washer or new Gas Cylinder Bracket.

15. Gas Lever Pin Hot; Result.—If no gloves, burnt hands. **Cause.**—Heat communicated from Barrel. **Remedy.**—Asbestos Gloves, or insertion in Handles of small Screw Driver which is hollowed out for that purpose.

16. Gas Piston Fouled; Result.—Does not work freely in Cylinder. **Cause.**—Fouling working all around Piston. **Remedy.**—Remove, scrape, polish and grease heavily around aperture. If worn: **Result.**—Non-automatic firing. **Remedy.**—New Piston.

17. Belt Guide Screw.—Not flush with Belt Guide. **Result.**—Screw head catches the Belt and might cause single shot, also destroys the Belt. **Cause.**—Not screwed down far enough or damaged head. **Remedy.**—Screw down level with Belt Guide.

18. Barrel Lock Broken At Split End; Result.—Difficulty in opening or closing the Lock, also by dropping down, preventing Gas Lever from closing. **Cause.**—Rough handling. **Remedy.**—“Carry on,” but replace when convenient.

19.—Bolt or Shell Extractor Spring Broken or Worn; Result.—Cartridge Case (shell) remains in Chamber and bullet of new cartridge strikes base of shell in Chamber. **Cause.**—Wear or dirt accumulating under Extractor. Heat or Faulty Cartridge sticking in Chamber. **Remedy.**—Examine and clean Shell Extractor, if broken replace. Remove shell by insertion of Cleaning Rod. This remedy should be frequently practiced in order to teach men the “immediate action” in the case of this break occurring.

20.—Ratchet Lever Pawl or Pawl Spring Worn; Result.—Feed Wheel fails to operate and the Gun stops firing. **Cause.**—Wear. **Remedy.**—New Pawl or Spring.

21.—Ejector Worn or broken; Result.—Cartridge Case remains in Receiver and loaded cartridge jams up under empty case. **Cause.**—Wear. **Remedy.**—New Ejector.

22.—Carrier Jam; Result.—Bullet forced between sides of Carrier. **Cause.**—Wear in either Carrier Dog or Dog Spring. **Remedy.**—Work Lever gently without allowing Bolt to touch cartridge, which loosens it and allows it to be removed.

23.—Safety Catch.—Remember if the Gas Lever is operated by hand that it liberates the Safety Catch and it will only prevent Gas Lever from performing another stroke by being kept in position by pressure of the thumb.

Hang fire caused by slow ignition, sometimes will last several seconds.

Miss-fires caused by broken or worn Firing Pin noticed by slight indentation on Cap, in both these cases; wait for about 30 seconds before touching the Gun, keeping the finger on the Trigger.

A Hot Barrel will explode a cartridge if left in Chamber, causing danger to the Crew and this should be consequently avoided.

Oil.—Be very free with oil on all parts but the Firing Pin, where about 2 drops will suffice. Oil may be squirted into the mechanism while firing, through the cutaway portions on the Right Side Plate.

Belt Extractor.—See that this doesn't rub against the side of the carrier and is centred properly.

Side Plate Screws.—The Rear Screw should be as tight as possible. The Front Screw not quite as tight.

Graphite and Glycerine mixed makes a good solution to apply to threads of the Barrel and around Bands and any part immediately connected with severe heat.

JUDGING DISTANCE

All members of the Gun Section should be experts in judging distance, they should have frequent practice in this. The easiest method of carrying out this practice is as follows: The Machine Gun Officer accompanied by his best judge of distance and a Range Finding Instrument will select suitable range marks, and note the ranges taken, on a Range Card. These Range Cards may be kept for subsequent use. The Section will be marched to the location selected and formed up in single rank facing the objectives. The object will then be pointed out by the Machine Gun Officer using the brief military terms. The time will be taken and a number of seconds allowed to judge the distance. This time should be decreased as the Section becomes more proficient, ranging from about fifteen to thirty seconds. The allotted time having expired, the Section is turned

about, and each man puts down in his Note Book his estimate of the distance. The N.C.O.'s will now pass down the ranks with their Ledgers, examine and note each man's estimate. The Section is then turned about, and number two (2) object pointed out. The procedure as above will be carried out until all the ranges marked on the Card have been estimated. The estimates of the various ranges will be filed for future reference and will be found very useful in selecting the most suitable men for Range Takers. A list, in order of merit, should be posted on the Order Board, after each practice, to encourage competition, and it will be found, the men are always interested. Care should be exercised when the Section is practising judging distance, that the men cannot compare notes. After the first few practices, the various distances judged at the practice should not be announced, until after the last object has been estimated, as the knowledge of one correct distance might greatly assist in arriving at a correct estimate of another. In judging distance when armed with rifles, the men will lie down and adjust their sights (in multiples of 50 yards) to their estimate of the range.

AIMING OFF FOR WIND

May be taught as follows:

Two men are given a regulation sized target each. One target is designated A, the other B. These men are now sent out some convenient distance (three or four hundred yards). The target A is erected. The Machine Gunner is now instructed to aim number of yards to the right or left. The Instructor now signals to B target, the number of feet or yards he instructed the Gunner to aim off to the right or left. B target

is now erected at that spot. If the Gun is now aimed at the bull's eye on B target the Gunner's estimate of "aiming off" is correct.

To avoid complications, when B target is placed in position, A target may be dropped.

SIGHTS

The Spaces marked on the Back Sight Bed mean that every division the Sight is moved over is equal to 4 inches per 100 yards, and every division or minute on the Thimble Adjustment at the side is equal to 1 inch per 100 yards, therefore, if there is a fresh wind blowing from right to left at 1000 yards, it will carry the bullet 6 yards or 18 feet out of its course, therefore 216 inches of wind has to be contended with, 1 minute at this range equal 10 inches, therefore roughly, 21 minutes are required, therefore move Back Sight 5 divisions to the right then add 1 by the Thimble at the side.

WIND

Drift is accounted for automatically by the grooves on the Arms of the Leaf of the Back Sight, but wind is not. The following table is easily memorized:

	Mild.	Fresh.	Strong.
500 yards	2 ft.	4 ft.	6 ft.
1000 yards	3 yds.	6 yds.	9 yds.
1500 yards	6 yds.	9 yds.	18 yds.
2000 yards	18 yds.	24 yds.	36 yds.

Remember, always move the Slide or Back Sight towards the wind.

Oblique Winds.—Halve the allowance for a right angled wind.

Head Wind.—Over 1000 yards, add 50 yards elevation.

Rear Wind.—Over 1000 yards, deduct 50 yards.

SIGNALS USED BY THE OBSERVATION POST OR BY THE PARTICULAR MAN DETAILED TO OBSERVE THE FIRE

- C.—Centre, meaning direction of fire is correct.
- M.—Minus, or the fire is 50 yards or less short of the mark.
- P.—Plus, or the fire is 50 yards or less over the mark.
- T.—Bullets striking to the right.
- L.—Bullets striking to the left.
- R.—Range correct.
- U.—Unobserved.
- Q.—Strike observed, but uncertain.
- P.P.—100 yards over object.
- P.PP.—150 yards over object and so on.
- MM.—100 yards short of object.
- MMM.—150 yards short of object and so on.

Signals by Controlling Officer, for:

Action.—The letter R, raised and lowered until it is seen the signal is being complied with.

Out of Action.—Arms swung in circular movement in front of body.

Gun Ready to Fire.—Hand up in line with head. No. 2 only gives this signal.

Preparatory to Fire.—Hand up.

Fire.—Hand dropped.

Cease Fire.—Elbow close to side, hand waved horizontally

CHAPTER VI.

TACTICS

The German Machine Gun tactics are clever, and in some cases, under certain circumstances, we might well imitate them. As an instance: In their retirements they will place Machine Guns in rear. These Guns, screened by the retiring troops, are exposed when the pursuit is fairly launched, thus inflicting disastrous losses on our troops. Another of their methods of Machine Gun operation which has proved effective is a concentration of Traverse fire on our head cover and parapets with a view to its destruction.

A prevalent failing of Machine Gun Sections is inactivity. A Machine Gun is made to be used, the popular phrases we are taught: "fire only against a favorable target," "hold your fire," and "operate by surprise," undeniably useful as they are, may have a tendency to cause an inexperienced Machine Gun Section to wait for chances which may never occur.

The Machine Gunner should know his Gun thoroughly, even to what it is doing in the dark. He should have frequent practice under all conditions with ball ammunition. He should know how his Gun shoots and its particular eccentricities. Just as the good chauffeur can tell the moment anything is wrong with his car, so the Machine Gunner should be able to distinguish any irregularity with his Gun.

The golden rule for Machine Guns is "Surprise," and surprise is the essence of tactical success.

The position of the Machine Gun Section when marching with a column should always be either

with the Advance or Rear Guard according to from which end of the column an attack may be expected. They are found to be of great use in checking the enemy and so allowing the main body to deploy. They can also seize and hold positions for subsequent use by the Artillery.

The Machine Gun Officer must look for orders from and co-operate with, the O.C., Advance or Rear Guard as the case may be.

When the main body have deployed, Machine Guns should be withdrawn and employed on the flanks.

When acting with an escort for a convoy, Guns may be in the front and rear waggons; these Guns should be mounted and in constant readiness for action, and, if the convoy is a long one, another may be placed in the centre. By this method should a flank attack occur oblique fire may be effected.

In the attack, while the Infantry are advancing in short rushes, all Machine Guns may be usefully employed in affording covering fire, and if possible for this purpose it is advisable to take up positions on high ground. By this means they can open fire sooner and continue firing longer than if they are on the same level as the advancing troops. For the purpose of covering fire, every man of the Machine Gun Section should have a thorough knowledge of the trajectory of the bullet he is using—for instance with the mark VI. ammunition when firing at a distance of 1000 yards from the enemy the bullet at 200 yards, from the Machine Gun is about $12\frac{1}{2}$ feet in the air, plus the height of the Mounting, say 15 feet—during its course it attains an altitude of about 26 feet, and when within 100 yards of the object aimed at will still be about 13 feet in the air, but with mark VII., owing to

the increased Muzzle velocity, pointed bullet and consequent flatter trajectory, the bullet under the circumstances mentioned above would only rise at 200 yards from the Machine Gun about 11 feet, 20 feet at culminating point and $10\frac{1}{2}$ feet at 100 yards from the object. Hence it can be seen that every Machine Gunner should know when it is safe, and when it is not safe, to afford covering fire to troops advancing. It might be advisable to say, that, under no circumstances should covering fire be opened by Machine Guns when on the same plane as the troops they are covering, unless at a greater range than 1000 yards, when fire should not be opened until troops are about 300 yards from Machine Gun, and fire should cease when the troops are at 200 yards from the enemy's position. Between these distances the bullet is never lower than about 16 feet from the ground and the advancing troops will be safe.

When employed in the firing line, Machine Guns should invariably be placed on the flanks where they form a valuable protection from a flanking attack and can bring converging or oblique fire to bear on their front, and unless the attacking troops advance in close formation, a target that can afford oblique or enfilade fire is essential for a Machine Gun. It must be remembered that a Machine Gun should never open fire unless a favorable target appears. The principal reason being that once the Gun opens fire, owing to the peculiar noise of the automatic firing, its position is usually given away, word is sent back to the hostile Artillery and in a short time the Gun is put out of action. Although a Machine Gun Section more or less expects this, its object is nevertheless to do as much damage as possible before being put out of action, or changing position. It is here that we must dwell upon the all important point; when

taking up a position, always select alternative positions, as frequently when you know that you are being watched continually by the enemy's Artillery, it may be necessary to move to No. 3 position almost directly after opening fire from No. 1, owing to your previous position being shelled.

In the attack, as soon as the last Reserve has been thrown in and the point at which the contemplated assault has been selected, the Machine Gun Officer will assist in bringing about an overwhelming fire at that point. As soon as the assault is over, if successful, the Machine Guns take up positions in the enemy's trench, reverse his parapet and prepare for any counter attack, or pursue the enemy with fire. During these stages, shields should be used when concealment is no longer possible.

When Machine Guns are successfully placed, and unless some great advantage offers itself, it is a great mistake to move them, as they may be seen and traced while on the move to their new position; and by having to get the ranges and cover, considerable loss of time is occasioned.

If an attack is unsuccessful, the Machine Guns can greatly assist in covering the retreat of the Infantry by Rapid Fire, thus checking the pursuit of the enemy. In doing this they may be asked to sacrifice themselves, but if by so doing they can enable their own Infantry to successfully take up a defensive position, they may be considered to have "saved the day."

In the defence it is advisable to divide the Guns up so that a portion of them may be used as a Mobile Reserve in the hands of the G.O.C., and may be thrown into any weak point or particular spot upon which the enemy appear to be concen-

trating their attention with a view to assault. For this purpose the ground should be thoroughly reconnoitred by both the Machine Gun Officer and Scouts, emplacements erected and positions located. When the moment arrives the Guns may be rushed to the most advantageous position and fire opened with the least possible delay.

In selecting a position for a Gun, care should be taken to remove any possible ranging mark near them such as a tree, or if the object is immovable, avoid being near it if possible.

Any prepared avenues of approach, roads, or defiles should be commanded if possible from two points so that converging fire may be effected.

Range Cards should be carefully prepared and when possible, tested by actual fire the position of Sights to various objects in the vicinity of which the enemy is likely to appear should be noted by the Machine Gun Officer.

Alternative positions must be provided.

A cover communicating trench should be provided to the Ammunition Shelter where the Belt Fillers are to work, this shelter had better be as close as possible to the emplacement.

All possible Belts should be filled and examined carefully for damaged cartridges.

The Gun should be carefully overhauled and the "Spare Parts" Case examined for shortages; an Oil Can should be in the possession of No. 2 and the Spare Barrel in the Open Boot under the Tripod ready for immediate use: the Spare Bolt should be assembled and ready for insertion.

A good sheltered position for the Waggon should be chosen.

In the Retreat.—The Guns if possible, should be placed in such a position that they will be able to get enfilade or oblique fire on the formation of the enemy's pursuit, by this means they will disorganize it and create caution on the enemy's part, which means delay in the pursuit, which spells failure for the enemy.

They may also be used to seize and hold the vital points known as pivots of manoeuvre; these points are situated, in connection with trench warfare, between the third and subsidiary lines and designated strong points, S.P. 7, S.P. 8, etc., and utilized in the counter attack.

With Outposts.—They may be used to command and bring enfilade fire upon any point which the enemy may have to pass in close formation, brought about by the placing of obstacles. At night, a Night Firing Box may be used to advantage, the Gun being laid and the Box placed during the day and a small view chart corresponding to the dial of the Box made. This Box may be improvised thus: Secure a box big enough to envelop an ordinary stable lantern, or whatever lantern you may be able to secure, bore air holes in the top to allow air for the lantern, then knock out one side and tack muslin or linen over it—this is the face, and when the lamp is lighted shows a dull white light, across this paint or draw three or four lines horizontally and the same number vertically, have the horizontal lines about 1 inch apart and the vertical about $2\frac{1}{2}$ inches, designate these lines A, B and C and their opposites D, E, F. You will now have 16 oblongs of which each may be numbered 1 to 16 and where the lines cross designated by their letters the centre of the dial being where lines B and E meet. We now have the following diagram:

	D E F			
A B C	1	2	3	4
	5	6	7	8
	9	10	11	12
	13	14	15	16

Now aim your Gun at one of the at one of the obstacles or any likely place where you may expect an attack at night—without disturbing the aim of the Gun, raise the Sight until the Peep and Fore Sight are in line with any given square or point on your dial, which will be moved into position by your assistant and operated any convenient distance from your Gun. Thus when your Sight is raised to say 2000 yards and aimed at the point BE, by moving it down to the correct aim and distance, for the obstacle, it will be aiming directly at it. Possibly there may be another object a little to the right of the last point, aim at this and repeat the process, carefully noting on a chart what each square or point on the dial represents, so that when it is dark, by aiming at the point BE. or the centre of square 4, with your sights at 2000 yards you know that in reality you are aiming at say an opening in a wall at 300 yards.

Indirect Fire.—Indirect Fire (as described elsewhere) will be found of use when the country is suitable and there is not time for the erection of

cover or making an emplacement, and has many advantages, as it is practically a case of being felt without being seen.

Vanishing Action.—Vanishing action as described in “Drill” may be used, especially when on the move, and when the disclosure of the position after vacated, does not matter.

Cover.—Cover is of two kinds—cover from view and cover from fire, but whichever is being utilized it must never obstruct a good view of the enemy. Cover from view is always of use as, if you are not seen, you are unlikely to be hit, but cover from fire, combined with a good field of fire, should when possible be aimed at. Conditions varying to such a great extent that it makes it difficult to suggest any set plan for an emplacement other than those laid down in the “Manual of Military Engineering,” but the following rules may be well to remember:

(1) Always protect yourself from enfilade fire by means of a traverse.

(2) Have some sandbags at hand, so that alterations may be made.

(3) Always have alternative positions.

(4) Have your Belt Fillers in a shelter near the emplacement with covered communication wherever possible.

(5) Get into position and “set-up” without being observed.

(6) Remember to hold your fire and thus effect surprise.

Under certain conditions a good position for a Machine Gun may be made by erecting a platform

up a tree. It will be found possible, although exceedingly difficult to operate a Machine Gun without a platform. Avoid masonry if Artillery are against you, as a shell striking masonry will cause stones to fly about which are as dangerous as splinters. If defending a garrison or village, dig an emplacement or if there is no Artillery against you, a good commanding view, with a possibility of cover such as an attic window is suitable.

When it is necessary to occupy an exposed position such as a house which may be in view of the enemy a good plan is to act as follows:

In approaching the position allow the enemy to see the party but not the Guns. On reaching the position, having mounted the Guns, and leaving in charge one man per gun, the remainder withdraw, allowing the enemy to see them. Then let the party return, taking great care **not** to be seen by the enemy. Having arrived they can await a favorable opportunity for opening fire. This ruse may be also effected in a similar manner by the Limbered Waggon. The Waggon being driven in such a way to deceive the enemy into thinking they are taking up the Guns and galloping off, but in reality leaving the Guns in position.

When necessary to take up a position in a house under Artillery fire **always** when taking up a position in the basement, shore up the ceiling with stout timbers or rails, so that in the event of the house collapsing through shell fire, the Gun's Crew will not be buried, also strew the floor or floors above with broken brick or some material which will detonate high angle fire coming in through the roof.

AMMUNITION

The Machine Gun takes the .303 B.S.A. ammunition, as used for the rifle. It is supplied in both mark VI. and mark VII. and either can be used, although mark VII is the issue at the time of writing.

COMPARATIVE COMPOSITION

Mark VI.

Charge.—31 grains cordite in about 60 strands.

Bullet.—Compound core 98% lead, 2 % antimony; envelope, 80% copper, 20% nickel; its length, 1.25".

Case.—Brass solid drawn 70% copper, 30% zinc.

Wad.—Glazed cardboard between bullet and charge.

Weight of Bullet—9 dwt. or nearly $\frac{1}{2}$ oz.

Weight of Cartridge—About 1 oz.

Weight of Box of 1000—80 lbs. 10 oz.

Weight of Box and Belt Loaded with 250.—About 18 lbs.

Mark VII.

Charge.—38 grains tubular M.D. cordite in about 40 small tubes.

Bullet.—Compound core the front portion being an alloy of pure aluminium, the rear portion being an alloy of 98% lead and 2% antimony; envelope, 80% copper, 20% nickel; its length is 1.28".

Case.—Brass solid drawn 70% copper, 30% zinc.

Wad.—Glazed cardboard between bullet and charge.

Weight of Bullet—About 7 dwt. or a little over, $\frac{7}{8}$ oz.

Weight of Cartridge—16 dwt. or $\frac{1}{3}$ oz.

Weight of Box of 1000 in Bandoliers.—74 lbs.

COMPOSITION OF CORDITE AND GUNCOTTON

Cordite.—35% Nitro Glycerine, and 65% Gun Cotton mixed in the presence of acetone, the resultant dough is pressed through a perforated plate, made in sizes from .01 to $\frac{1}{2}$ inch in diameter. Cordite is not affected by damp.

Gun Cotton.—Cotton waste carefully washed, dried and combed out, soaked in 1 part nitric acid to 3 parts sulphuric acid and then dried.

It will be noticed that in the mark VII. the bullet is lighter by about 2 dwt. than mark VI., but the charge is heavier by 7 grains. The mark VII. bullet is pointed, whereas the mark VI. is rounded. The two cartridges are easily distinguishable from each other by this marked difference.

The abbreviated Trajectory Table on next page should be memorized for use when affording covering fire:

TRAJECTORY TABLE—MARK VII.

yds.	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
700	4.3	5.6	6.1	5.5	3.6								
800	5.7	7.6	8.8	8.9	7.6	4.8							
900	7.3	10.0	12.0	12.8	12.4	10.3	6.3						
1000	9.1	12.7	15.5	17.5	17.8	16.8	13.5	8.2					
1100	11.2	15.8	19.7	22.7	24.1	24.1	22.0	17.6	10.5				
1200	13.5	19.4	24.4	28.6	31.1	32.4	31.4	28.3	22.2	12.9			
1300	16.0	22.0	30.0	35.0	39.0	42.0	42.0	40.0	36.0	28.0	16.0		
1400	19.0	28.0	36.0	43.0	48.0	53.0	54.0	54.0	51.0	45.0	35.0	20.0	
1500	23.0	33.0	43.0	52.0	59.0	64.0	68.0	69.0	68.0	63.0	55.0	42.0	24.0

The trajectory of the mark VII. bullet is much flatter than the mark VI., though at the extreme ranges the mark VI. is flatter than the mark VII.—for instance, the height of the culminating point of the bullet at the following ranges with mark VI. and mark VII. are interesting to note:

		Height in Feet	
	C.P. about	Mark VI.	Mark VII.
500	300 yards ..	3.7	2.3
1000	600 “ ..	23.8	17.8
1500	900 “ ..	82.0	69.0
2000	1200 “ ..	206.0	195.0
2800	1700 “ ..	637.0	711.0

It will be noticed that the culminating point is from about 50% up to 60% of the distance, the percentage increasing as the distance increases.

It is interesting to note that the penetrating power of the mark VII. bullet is less than the mark VI., owing to the bullet upsetting very easily.

The base of the bullet is .311 in order to enable it to get a good grip of the rifling.

Drift in a bullet is caused by the bullet rolling over in the air, as in its course of say 1500 yards, taking about 3 seconds to travel this distance, it rotates 5250 times, as the velocity decreases the grip of the air increases and causes it to roll over or drift, about 7 feet at this distance, although at 1000 yards the drift is only about 2 feet.—The Leaf of the Back Sight of the Colt Gun has a fixed adjustment which works automatically to throw over the Back Sight to overcome this lateral movement.

AMMUNITION SUPPLY

For each Machine Gun in the field there should be 41,500 or 166,000 rounds per Section of 4 Guns; an additional 8,000 rounds per Gun is issued to Cavalry Sections. These amounts are divided up as follows:

14000 on lines of communication.

6000 with the Ammunition Park.

5000 with the Divisional Ammunition Column.

5000 with Field Artillery Brigade Ammunition Column.

8000 in S.A.A. Carts of the Section.

3500 in the Limbered Waggon.

The additional 8000 rounds for Cavalry Section are carried in the Regimental Reserve.

Ammunition on the field is supplied by the load, no indent is necessary on the Ammunition Column, and a receipt will be given by the Officer receiving the ammunition to the Officer delivering same.

A load for a S.A.A. cart is 16000 rounds.

A load for a Limbered Waggon, 16000 rounds.

G.S. Waggon, 40,000 rounds.

Pack Animal, 2 boxes (2000 rounds).

Pack Animal, 2 boxes (2000 rounds).

Three ton lorry, 80,000 rounds.

It might be noticed that the total supply for an Infantryman is 550 rounds as compared to 41500 for a Machine Gun. It has been proved that the accuracy of the Machine Gun is greater than that of a rifle, therefore, as there are 75 rounds issued to the Machine Gun for every 1 issued to the rifle, the Machine Gun may well be said to equal at least 50 rifles.

CHAPTER VII.

INDIRECT FIRE—THE LEWIS MACHINE GUN—NOTES

INDIRECT FIRE

How to arrive at the correct amount of elevation or depression in angles, to adjust a Machine Gun for Indirect Fire:

O=Reference object or the obstruction in front of the Gun.

G=Machine Gun.

T=Target.

L^a & L^b =Horizontal level

L^a OG=Angle from RO to G.

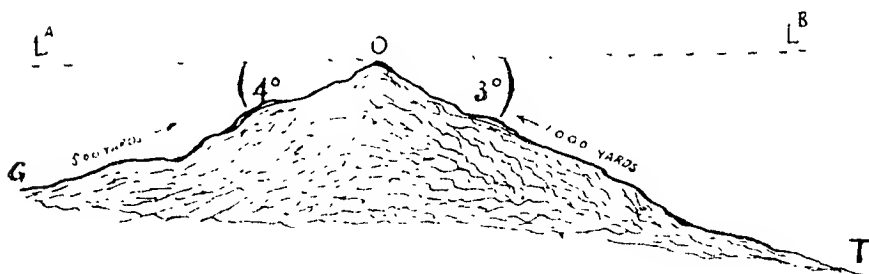
L^b OT=Angle from RO to T.

When T is above L the angle is added.

“ T “ below L “ subtracted.

“ G “ above L “ subtracted.

“ G “ below L “ added.



Thus: If distance from O to G is 500 yards, and distance from O to T is 1000, if Gun and Target are both below L^a and L^b , and the angle L^a and OG is 4° and the angle L^b OT 3°

Use the following Formula:

$$\frac{+500 \text{ yds.} \times 4^\circ}{1500 \text{ yds.}} \times \frac{-1000 \text{ yds.} \times 3^\circ}{1500 \text{ yds.}}$$

$$= \frac{+2000}{1500} \times \frac{-3000}{1500}$$

$$= \frac{+20}{15} \times \frac{-30}{15} = \frac{+4}{3} \times \frac{-6}{3} = -\frac{2}{3}$$

=—two thirds of sixty minutes.

=—40' + 2° 15' (angle of Tangent Elevation)

=+1° 35'=angle to be adjusted on Gun.

Thus if G above L, and T is below, answer would be a minus quantity, or the degrees of depression must be deducted from the angle of Tangent Elevation.

Thus if G is below L, and T is above L, answer would be a plus quantity or the degrees of elevation must be added to the angle of Tangent Elevation.

(2) In selecting Gun positions consider:

- (a) Most effective line of fire.
- (b) Angle of descent of bullets.
- (c) Position of our own trenches.

Avoid—

(a) Vicinity of houses or Artillery observation stations.

(b) Roads used by troops.

(3) During intervals between firing, check dial reading to reference object. If it has shifted, readings to other points must be altered accordingly.

(4) Be certain that elevation and depression angles are not confused.

(5) Note.—1 degree is 5 feet of Traverse for every 100 yards of range. Thus, at 2000 yards 1 degree represents 100 feet or 33 yards of Traverse.

An aiming post is required with a cross-bar on it marked in divisions of $7\frac{1}{2}$ inches which will fire $\frac{1}{2}$ degrees at 25 yards.

(a) Plot on the map magnetic bearing to centre of area to be searched (say 71 degrees).

(b) From G take a compass bearing 71 degrees and note a point in that line as an aiming point.

(c) Lay the Gun on the aiming mark and set up the aiming post in line with the aiming mark and **25 yards from the Gun.**

(d) Ensure that the cross-bar is at right angles to the line of fire by taking a bearing along it—(in this case 161 degrees).

2. It is of the greatest importance that you should, when detailing Guns for this work, strictly follow these instructions.

4. This form of fire has the following advantages:

(a) The whole of the enemy's support and reserves lines, his cooking places and lines of approach, etc., can be covered night and day by accurate Machine Gun fire, and his sleep constantly disturbed; and where trenches are more than 300 yards apart, fire can be brought on to his front line at angles of descent varying from 1 in 12 at 1500, to 1 in 2 at 2800.

The searching effect of this fire as compared with short range fire will be realised when it is seen that even at 1,000 yards the bullet only falls at an angle of 1 in 37 or 8 feet in 100 yards.

(b) It is suited to any form of ground, and the long range should ensure that the fire clears any obstructions between you and the target, which often makes close range fire impossible.

(c) The careful organization of Guns placed well in the rear, and where they will be practically out of danger, and can get to know the enemy's vulnerable points, and turn on to them at a mo-

ment's notice, will reduce the necessity for firing Guns from the front line, (except in the case of an enemy attack), to a minimum.

The consequent danger of their being located and put out of action is reduced.

When occasion arises for part of your Guns to support an Infantry attack, you may find that the Guns are placed in the most advantageous position to do so, and will give much more effective support owing to the fact that they are already intimately acquainted with the ground which they have to search, than they would be if detailed for the duty the same day as the attack. In the event of an attack on our lines by the enemy, they will be able to sweep the enemy lines of approach and prevent him bringing up reserves.

(d) From a training point of view it will be found to be of the greatest value, as men who are as a rule able to fire very little except in an attack, can be constantly practised in firing ball ammunition, under the most favorable moral conditions.

Belts of stoppages can be set up and rectified both by day and by night, and the standard of Machine Gunnery improved in every way. For instance, the necessity for good holding is shown by the fact that the Clinometer will show a difference on the average of 10 minutes, if the Gun is held or otherwise.

This form of fire can, however, be applied to any map, the larger the scale the better.

The certificate on the Enlarging Block is to ensure that no friction is caused by the uncontrolled use of indirect fire and must be strictly adhered to.

The supply of S.A.A. ammunition is satisfactory and warrants the use of this method of fire. The

methods of searching a piece of ground can be greatly varied and it is easy to work out from the Beaten Zones and Horizontal Zones Tables the minimum number of bursts required to search any area of ground or the area which any one burst will cover.

You will also notice in your instructions what the value of 1 degree of Traverse is in yards.

Clinometers are part of your equipment and, if not in your possession, you should indent for them at once.

Your Elevation Tables will show you the necessity for allowing for your angle of sight, and of estimating your height on the ground as accurately as possible.

6. The Legs of the Tripod should be well dug in.

Table of Allowances for Normal Conditions

1.—Horizontal line of sight.

2.—No wind.

3.—Barometer 30 degrees

4.—Thermometer 60 degrees F.

(sea level).

Any departure from above is error of day

—See Table Allowance.

Atmosphere Influences

Under 1000x for 1 influence allow—Nil x

Under 1000x for 2 or more allow—50x

1000x to 1500x" 1 influence allow—50x

1000x to 1500x" 2 or more allow—100x

Over 1500x 1 influence allow—100x

Over 1500x 2 or more allow—150x

Influences to be allowed for.

More For

1.—Cold.

2.—Head Winds.

3.—Extreme Dryness.

Less For

1.—Rain.

2.—Rear Winds.

3.—Heat.

4.—Height Above Sea.

N.B.—A combination of opposite influence may cancel one another wholly or partially.

INDIRECT FIRE BY MEANS OF MAP AND COMPASS

1. To direct fire on to an invisible target, you must know accurately position of Gun and direction of target. To fix direction of target you use some convenient visible point as a reference object (R.O.).

The process is as follows:

On Map.—Fix position of Gun and direction of R.O. Measure angle between this direction and that of target.

On Ground.—Lay Gun on R.O. and take reading by means of dial. Add or subtract angle already measured on map, which gives you reading of target. Lay Gun on this reading and it will be directed on target.

3. Practical Points:

(1) If time permits build an invisible dug-out, shell-proof, with the loophole allowing of elevation or depression towards the target and loophole from which R.O. can be seen. Put out Night Firing Box in line with R.O. so that position of Gun can be checked at night in case Tripod should shift.

Range Yards	Angle of Elevation		Range Yards	Angle of Elevation	
	°	'		°	'
700		38	1800.....	3	23
800		46	1900.....	3	52
900		54	2000.....	4	24
1000	1	3	2100.....	5	05
1100	1	14	2200.....	5	41
1200	1	27	2300.....	6	26
1300	1	41	2400.....	7	17
1400	1	57	2500.....	8	14
1500	2	15	2600.....	9	18
1600	2	35	2700.....	10	30
1700	2	58	2800.....	11	50

THE LEWIS MACHINE GUN

The Lewis Machine Rifle as it is called, must not be confused with the heavier type of Machine Gun. The role imparted to the Lewis Machine Rifle differs to a great extent to that of the Vickers-Maxim or Colt and all heavier Mounted Machine Guns. The Lewis Gun is used exclusively for direct fire, usually in the first line trenches, and is carried forward with the assaulting party usually with the second line. Owing to the lightness of the Mount and the Shoulder Holding, it is obvious it cannot be used for either covering (overhead) fire or indirect fire, where the stability of the Mount and consequently of the Gun itself, are of primary importance.

It will be seen that these Shoulder Machine Rifles, although of great use in their particular sphere, can only be classed with Machine Guns in the one sense of the word; that they are automatically loaded and fired.

Owing to none of the working parts protruding from the Radiator Casing, the Gun can easily be slipped over the top of a parapet, whereas with the Colt Gun, the swing of the Gas Lever has to be accounted for.

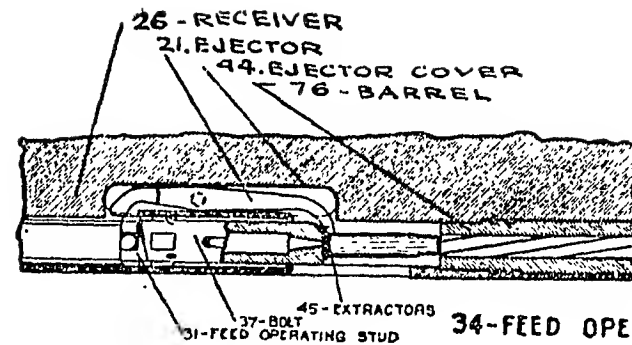
In the new Establishment it is proposed to have both Machine Gun Companies and also Machine Rifle (Lewis) Companies. These Companies, although trained similarly, will be kept separate from each other.

DESCRIPTION

Weight: 25 $\frac{1}{4}$ lbs.

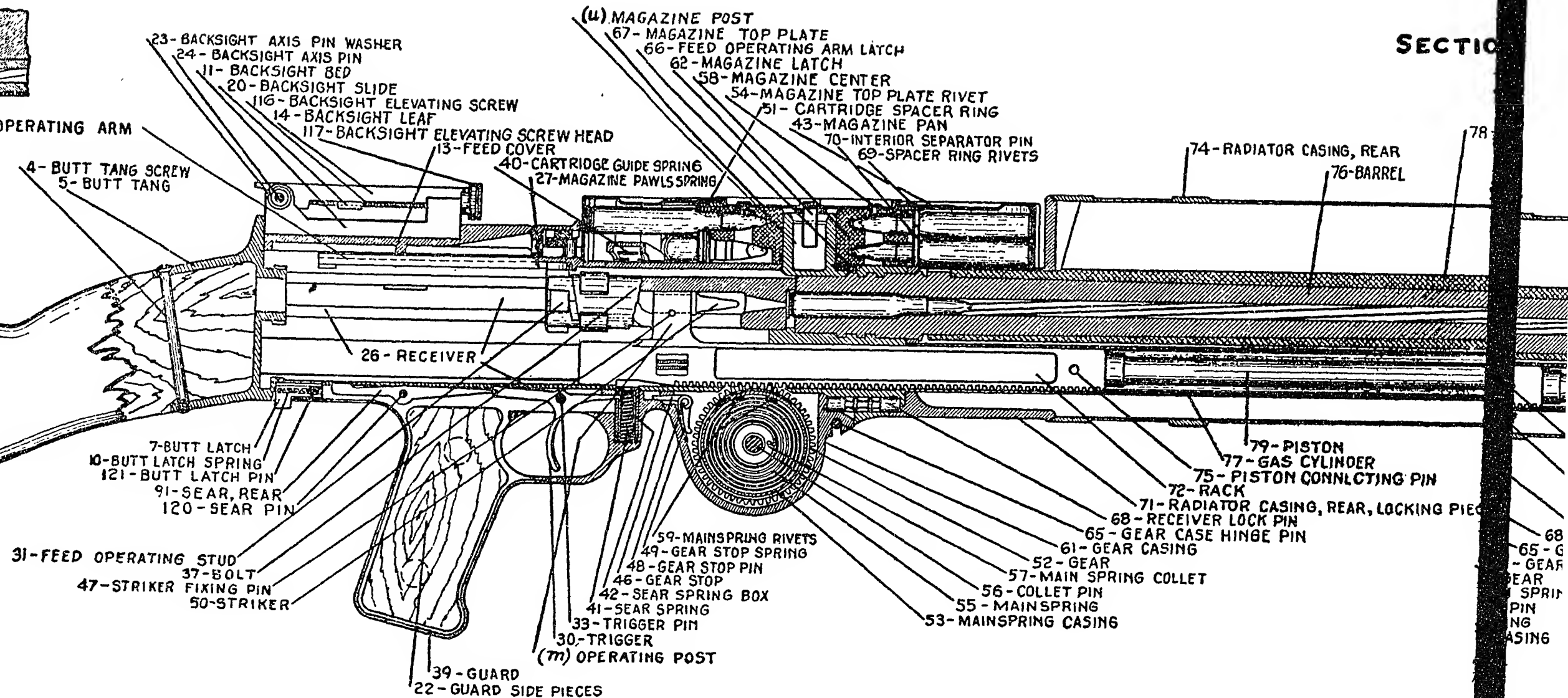
Gas operated (see action).

Air cooled, the "pushing" force of the spent gases as they follow the "pulling" forces of the



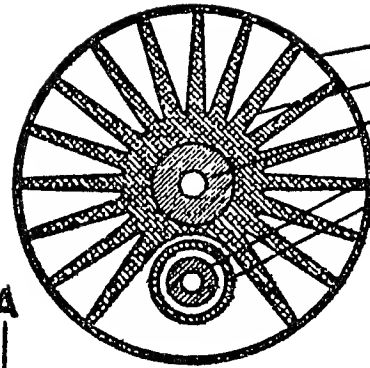
EJECTING A CASE

- 1-BUTT PLATE
- 2-BUTT PLATE SCREWS
- 3-BUTT STOCK



SECTION

SECTION AB



- 74-RADIATOR CASING, REAR
- 78-RADIATOR
- 76-BARREL
- 79-PISTON
- 77-GAS CYLINDER

- 88-CLAMP RING SCREW
- 83-GAS CHAMBER BAND

- 86-FRONT SIGHT
- 85-CLAMP RING
- 87-CLAMP RING POSITIONING SCREW
- 89-BARREL MOUTH-PIECE
- 90-RADIATOR CASING, FRONT

(a) GAS PORT

85-CLAMP RING

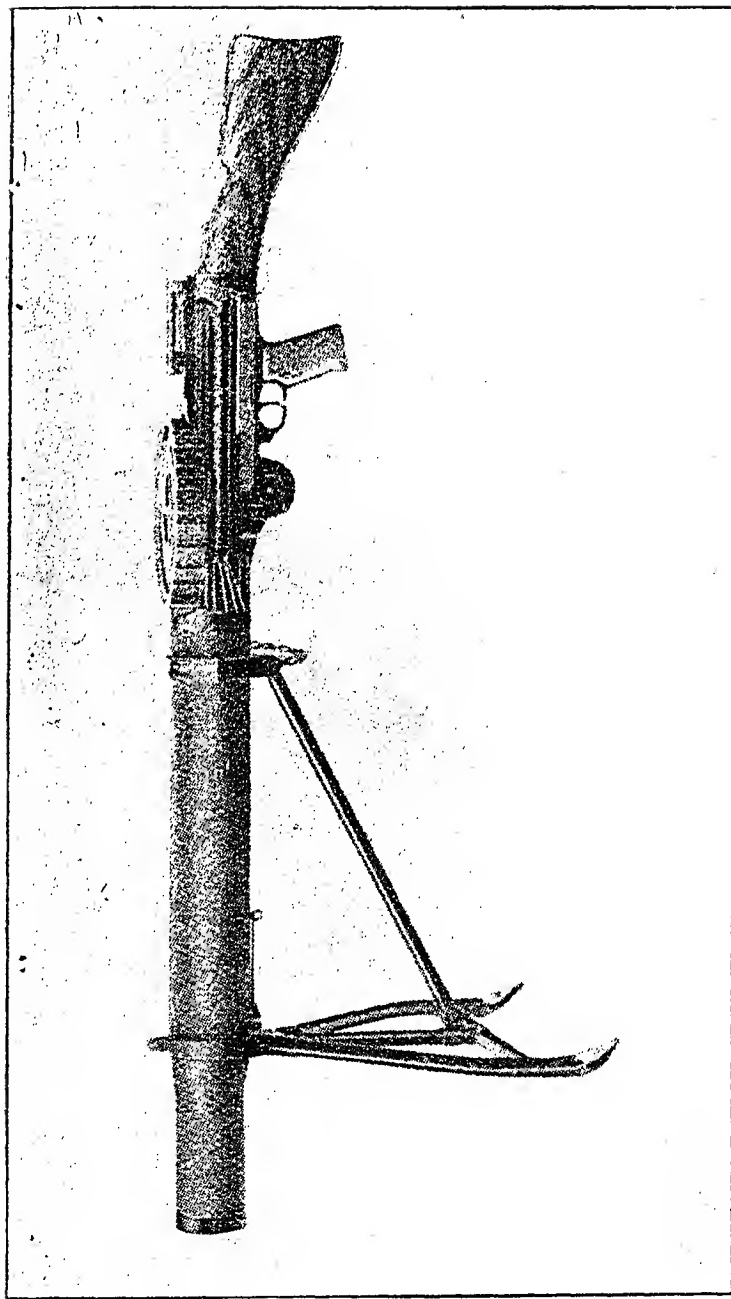
- 84-GAS REGULATOR CUP
- 82-GAS CHAMBER
- 81-GAS REGULATOR KEY
- 80-GAS REGULATOR KEY STUD

- 74-RADIATOR CASING, REAR
- 76-BARREL

78-RADIATOR

- 79-PISTON
- 77-GAS CYLINDER
- 75-PISTON CONNECTING PIN
- 72-RACK

- 71-RADIATOR CASING, REAR, LOCKING PIECE
- 68-RECEIVER LOCK PIN
- 65-GEAR CASE HINGE PIN
- GEAR CASE
- GEAR
- SPRING COLLET
- PIN
- ING
- CASING



LEWIS:—Gun complete, with Magazine and Light Folding Field Mount.

vacuum behind the bullet, being retained in the Fore End of the Radiator; draw or suck, a continual draught of cool air from the rear through the Radiator.

Velocity is unaffected, as, before the bullet has reached the Vent Hole in the Barrel, it is already travelling at a greater speed than the pursuing gases. The pressure on the bullet at the Gas Vent is about $13\frac{1}{2}$ tons, whereas at 12 inches from the mouth of the Chamber it has a pressure of 17 tons behind it; consequently at about 13 inches from the Chamber it has attained its maximum velocity and is travelling faster than the force or gases of the exploded charge.

Rate of Fire.—The Magazine containing 47 cartridges, feeds the Gun at the rate of 800 rounds per minute or 47 rounds in about $3\frac{1}{2}$ seconds, therefore, allowing time for the changing of 17 Magazines, an actual speed of about 400 rounds per minute would be accomplished.

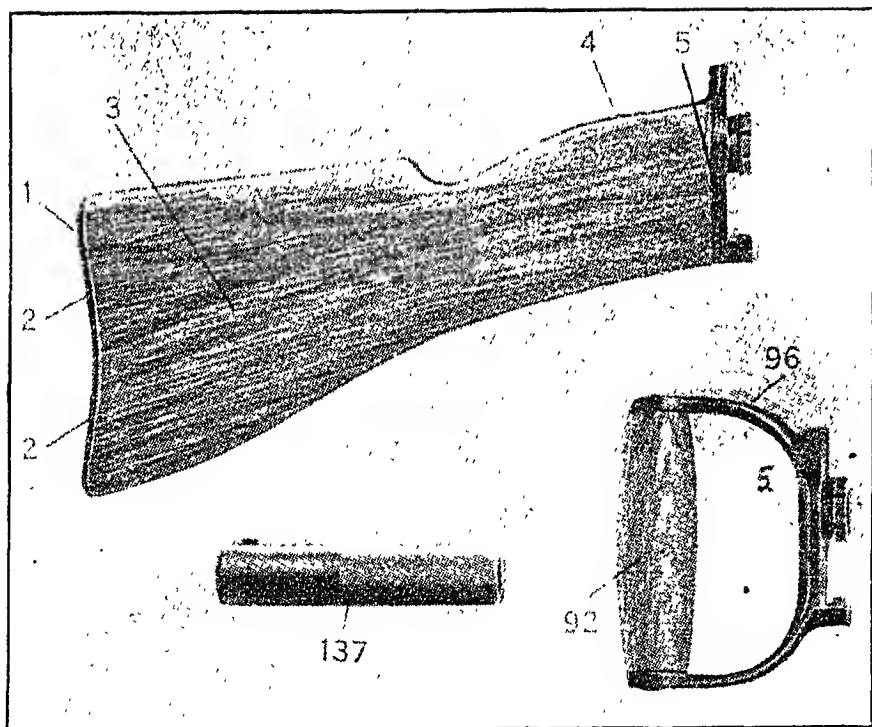
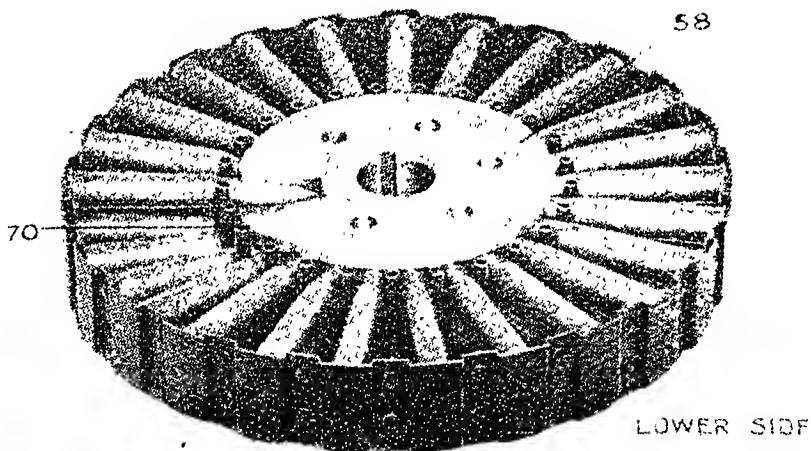
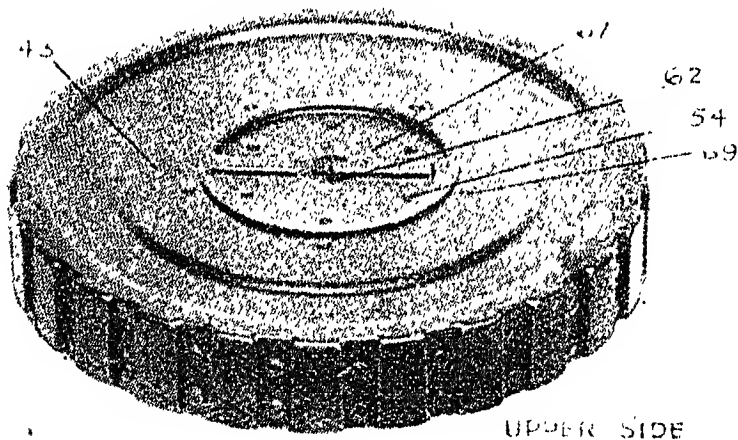


PLATE 6.—Accessories: Buttstocks and Magazine Filling Handle

- | | |
|-------------------------|-------------------------------|
| 1. Butt Plate. | 5. Butt Tang. |
| 2. 2 Butt Plate Screws. | 92. Hand Grip. |
| 3. Butt Stock. | 96. Spade Grip Tang. |
| 4. Butt Tang Screw. | 137. Magazine Filling Handle. |

The Butt is detachable and used when the Gun is Mounted or as a Shoulder Support when no Mount is used.

The Spade Grip is used to reduce the length of the Gun when Mounted in a limited space, such as an aeroplane.



- 43. Magazine Pan.
- 67. Magazine Top Plate.
- 62. Magazine Latch.
- 54. Magazine Top Plate Rivets (6).
- 69. Magazine Spacer Ring Rivets.
- 58. Magazine Centre.
- 70. Magazine Interior Separator Pins.

Feed.—The Gun is fed by means of a circular Magazine; it contains 47 cartridges and weighs when loaded about 3 lbs.

This Magazine is rotated by the Feed Pawl.

These Magazine Pans are easily carried by placing them one on top of the other in a canvas bucket.

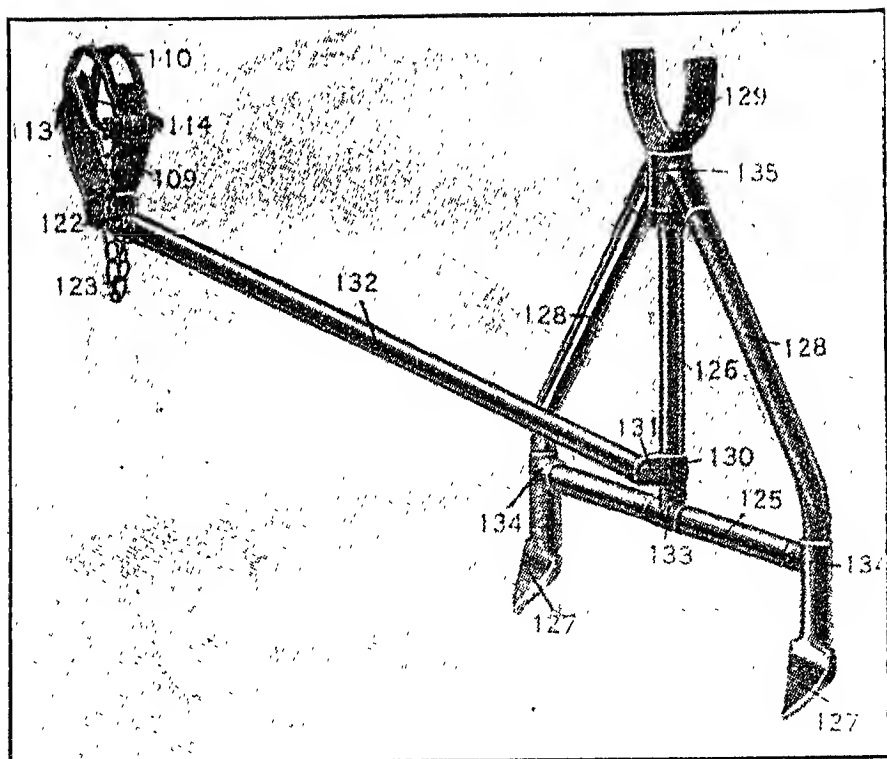


PLATE 14.—Accessories: Light Folding Field Mount Complete

- | | |
|---------------------|--------------------------|
| 110. Mounting Yoke | 132. Rear Brace. |
| 113. Mounting Yoke | 129. Front Yoke. |
| 114. Mounting Yoke | 135. Top Lug. |
| 109. Mounting Yoke. | 128. Front Legs. |
| 122. Mounting Yoke | 126. Centre Post. |
| 123. Mounting Yoke | 131. Knuckle Joint Pin. |
| Chain. | 130. Knuckle Joint. |
| | 125. Bottom Cross Brace. |
| | 133. T Joint Centre. |
| | 134. T Joint Side. |
| | 127. Feet. |

The Mount weighs $3\frac{1}{2}$ lbs., and is used as a Support for the Forward End of the Gun when necessary, the Clamp rests on the Front Yoke, the Rear Ring of the Radiator Casing is clamped to the Mounting Yoke. The Brace, which connects the Front and Rear Mounting Yokes, permits of the Gun both vertically and horizontally.

ACTION

Gas Operated.—Just as in the Colt, the spent gas strikes down through a Vent Hole or port, at the forward end of the Barrel, but in this case it enters a Chamber where its direction is changed at right angles to its original course and strikes the head of a Piston, which, being attached to a Rod, drives this Rod rearward against the pressure of a Spring.

Connected to the Rod (through the medium of a Post called the Operating Post) is the Bolt, attached to which is a Stud, this, actuating in the curved groove of the Operating Arm, feeds the Gun and actuates the Feed Mechanism.

Attached to this Operating Post is the Firing Pin or Striker.

The Operating Post engaging in the Cam Slot in the Bolt carries it forward until the Resistance Lugs arrive at the Locking Recess when the action of the still moving Operating Post rotates and locks the Bolt, at the same time the point of the Striker thrusts itself through the Aperture in the Face of the Bolt and fires the cartridge. The Gas therefore, operates the Rod backward, and a Coil Spring attached to a Gear whose Cogs fit into the Cogs of the Rack of the Operating Rod, carries it forward.

The Bolt at the forward end indirectly carries out the firing of the cartridge and the subsequent extraction and ejection of the empty case; it also carries forward and places a new cartridge in the Chamber.

The Gear Spring should have a tension of about $13\frac{1}{2}$ lbs., which can be tested by holding back the Trigger and pulling back on the Charging Handle with a small Spring Balance.

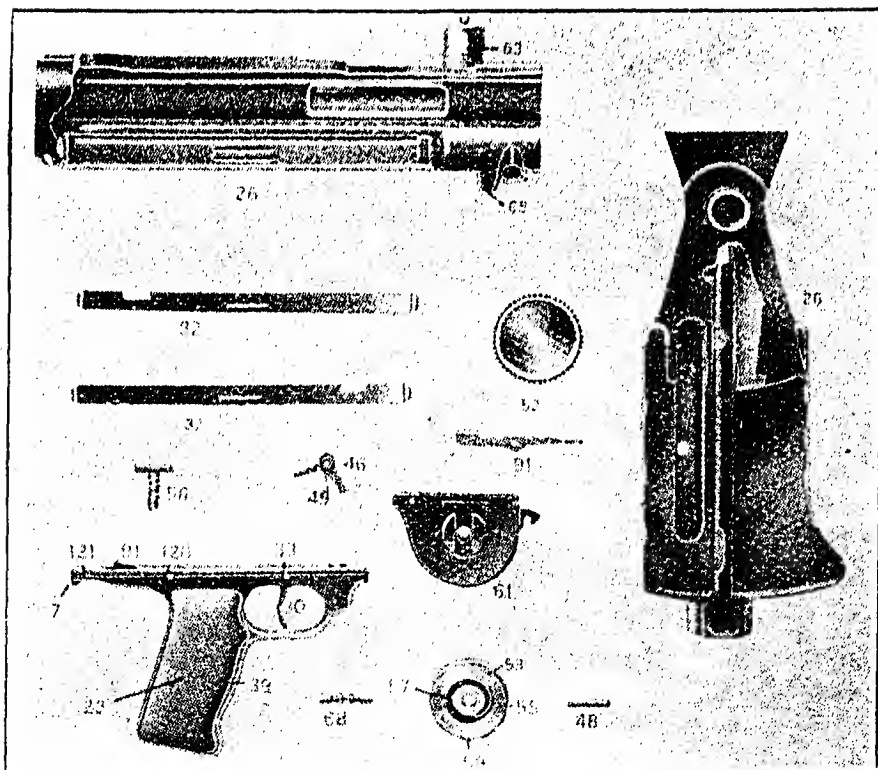


PLATE 3.—Gun Parts: Receiver Group, Mainspring and Trigger Mechanism

- | | |
|-------------------------|-------------------------|
| U. Magazine Post. | 121. Butt Latch Pin. |
| 63. Centre Key. | 120. Sear Pin. |
| 26. Receiver. | 33. Trigger Pin. |
| 65. Gear Case Hinge Pin | 30. Trigger. |
| 32. (Right and Left) | 7. Butt Latch. |
| Safety. | 22. Guard Side Pieces. |
| 52. Gear. | 29. Guard. |
| 56. Collet Pin. | 68. Receiver Lock Pin. |
| 49. Gear Stop Spring. | 57. Main Spring Collet. |
| 46. Gear Stop. | 53. Main Spring Casing. |
| 91. Sear, Rear. | 55. Main Spring. |
| 61. Gear Casing. | 59. Main Spring Rivets. |
| | 48. Gear Stop Pin. |

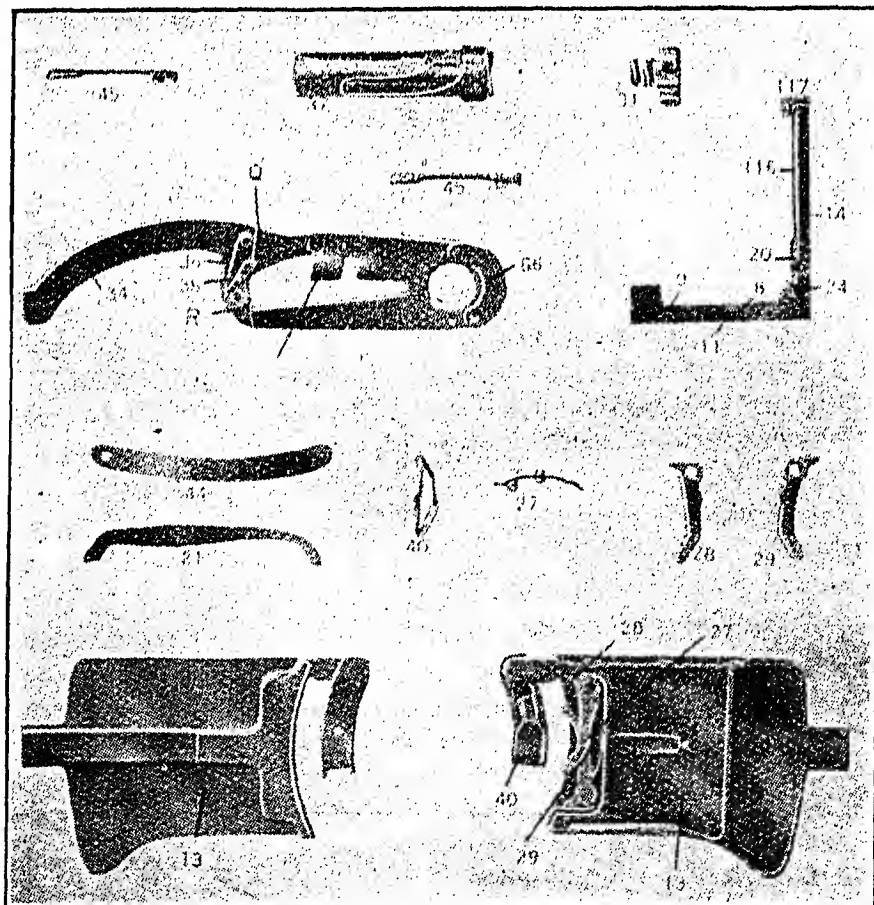


PLATE 4.—Gun Parts: Feed Mechanism, Bolt, Extractors and Ejector

- | | |
|--------------------------------------|-------------------------------|
| 45. Extractors (2). | 66. Feed Operating Arm Latch. |
| 37. Bolt. | Q. Feed Pawl Stud. |
| 31. Feed Operating Stud | 36. Feed Pawl Spring. |
| 117. Backsight Elevating Screw Head. | 35. Feed Pawl. |
| 116. Backsight Elevating Screw. | R. Feed Pawl Stud. |
| 14. Backsight Leaf. | 34. Feed Operating Arm. |
| 20. Backsight Slide. | 44. Ejector Cover. |
| 24. Backsight Axis Pin. | 21. Ejector. |
| 8. Backsight Bed Spring. | 40. Cartridge Guide Spring. |
| 11. Backsight Bed. | 27. Magazine Pawl Spring. |
| 9. Backsight Bed Spring Screw. | 28. Stop Pawl. |
| | 29. Rebound Pawl. |
| | 13. Feed Cover. |

NOTES

From the Front, by kind permission of Lieut. W. H. Webb, Brigade Machine Gun Officer, 6th Brigade.

France, Jan. 1st, 1916.

The Authorities are now of the opinion that a Machine Gun when in the hands of efficient men, is equal to 100 rifles.

Trenches are usually arranged as follows: First line (firing line), second and third lines, supports, connected by communicating trenches, now dug almost straight with "bridges" piled up 4 feet high with sand bags to stop enfilade fire. Connected to the third line by communicating trenches, and perhaps 3000 yards in rear is the subsidiary line, between this line and the third line are the Strong Points marked and numbered thus: S.P. 7, and connected to the subsidiary line by communicating trenches is the General Head Quarters line, and in rear of this again is the Divisional Reserve and Billets for the men.

The rifles of the Machine Gun Section should be carried in the Limbered Waggon which are packed as follows:

Rear Portion: 18 boxes S.A. Ammunition in the bottom, 2 Guns (1 each side) Barrels in the middle, 2 Mountings laid beside their respective Guns.

Front Portion: 10 boxes S.A. Ammunition, Belt fillers, Spare Parts, Tools, etc.

On the March: Corporal marches next to the tailboard, then Nos. 3 and 4, then 1 and 2, then 5 and 6, and the Sergeant in rear.

Co-operation

Co-operation is the by-word at the Front at present, without co-operation one Gun with another, one Section with another, one Battalion with an-

other, one Brigade with another and so on, our chances of success are not half so great as they are if this all important factor is ever kept uppermost in our minds.

Points to Observe

1. The two men in charge of a Gun in the trenches should each carry two Mills Bombs in their pockets and the Nos. 1 a spare Bolt.
2. Nos. 1 and 2 should also have a Veries Pistol and a supply of Veries Lights which they use when necessary to illuminate their front during an attack at night.
3. They also carry with them or have near them, their "Salvus" Gas Mask.
4. No Gun must fire out of an emplacement except in case of an attack.
5. Firing at enemy working parties must be done over the parapet some distance from the emplacements, so that they cannot be located by the enemy.
6. All Belts should be treated with a solution of $1\frac{1}{2}$ lbs. of paraffin wax dissoived in $\frac{1}{2}$ pint Naphtha, soak the Belt for half an hour, then wring out and dry in a temperature not exceeding 100° Far.
7. Guns should have a rope tied to one of their Legs when in an emplacement as if it gets buried it can be traced or pulled out.
8. Guns should be about 50 yards apart, to contend with the German shrapnel which has a forward effect of about 200 yards, and 35 yards laterally.
9. In the Attack the Guns should not be taken up until the first, second, often the third line have started, Machine Guns should get in and hold the trench against the inevitable; enemy counter attack.
10. Range Cards should be made on a piece of wood and hung up in the emplacement.

11. Gun Parts exposed to great heat should be lubricated with graphite and glycerine.

12. Gas Asphyxiating.—During a gas attack, the firing line moves back to the support trenches. The Machine Gunners don't. They don their "Salvus" breathing apparatus and remain at their posts.

As some chemical in the gas affects the working parts and metal of the Gun, to avoid this, intermittent fire should be kept up which helps to disperse the gas and prevents the Gun "sticking."

After the attack, if possible, keep the Gun out of low lying ground, dug outs and damp emplacements, Strip, Clean thoroughly and put away in Boot.

13. Keep Clear of Salients as they are liable to be sapped by the enemy.

14. Guns must cross fire their neighbors on either side, this includes flank Guns of a Brigade.

15. Emplacements must be kept secret.

16. Each Gun Crew should have its dug-out not more than 20 paces from the emplacement.

17. Never do what a rifle can do for you.

18. An Observer should be told off daily to observe minutely the enemy's parapet for any signs of alterations and this man should be provided with a powerful telescope.

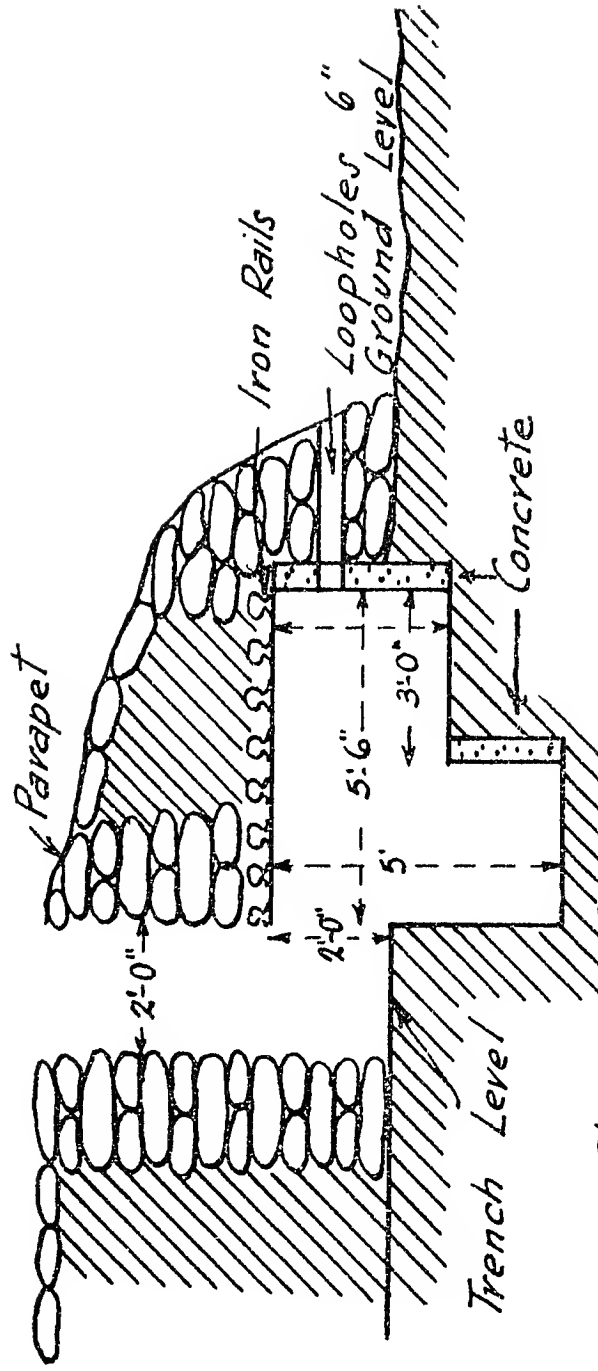
19. Guns must be kept loaded. Ready all night.

20. A Daily Report must be sent to Head Quarters with any minute detail of significance mentioned, including the direction of the wind (in view of a gas attack).

21. All Roads in rear of the trenches must be guarded in case of a break through.

22. Beware of Cross Roads, the enemy have them all marked and ranged on.

23. Searching fire is delivered nearly every day from positions near the subsidiary line, when roads, etc., in rear of the enemy's position are searched.



*Showing German M.G. emplacements with
loophole approximately 2'-0" above ground level.*

There are several types of Machine Gun Emplacements (see M.F.E.). The above German specimen is recommended for use in breastwork

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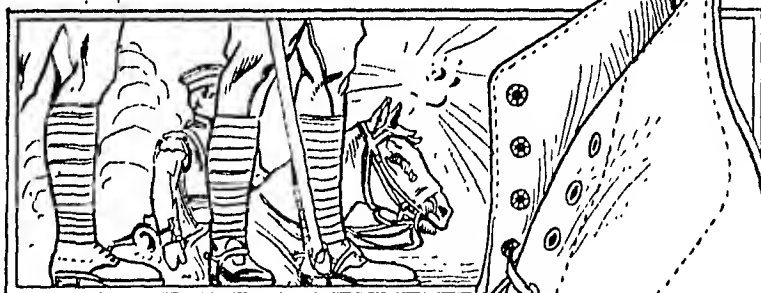
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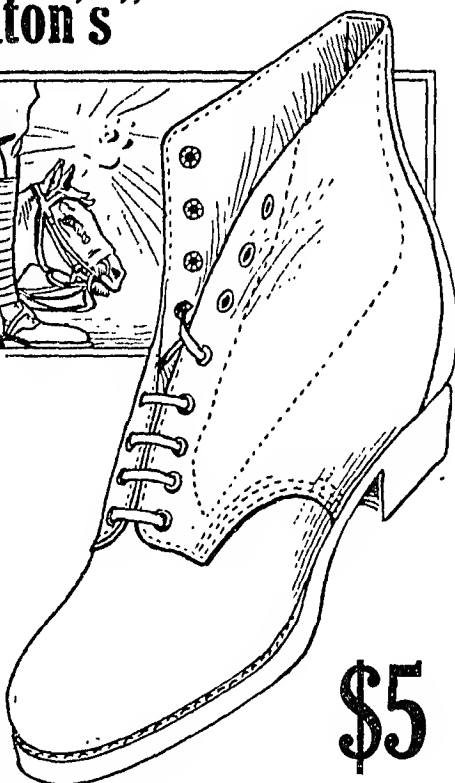
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